OCTOBER 3, 1960

PAPER TRADE JOURNAL

How Weston's Disposal of Mill Effluent Halves Stream BOD Level

Nicolet Prepares Glassine Stock In Extensive Three-Phase System

Complete Up-to-Date List Shows 55 New Mills, Expansions On Tap

Special Methods of Metalizing Paper Noted in Exclusive Article

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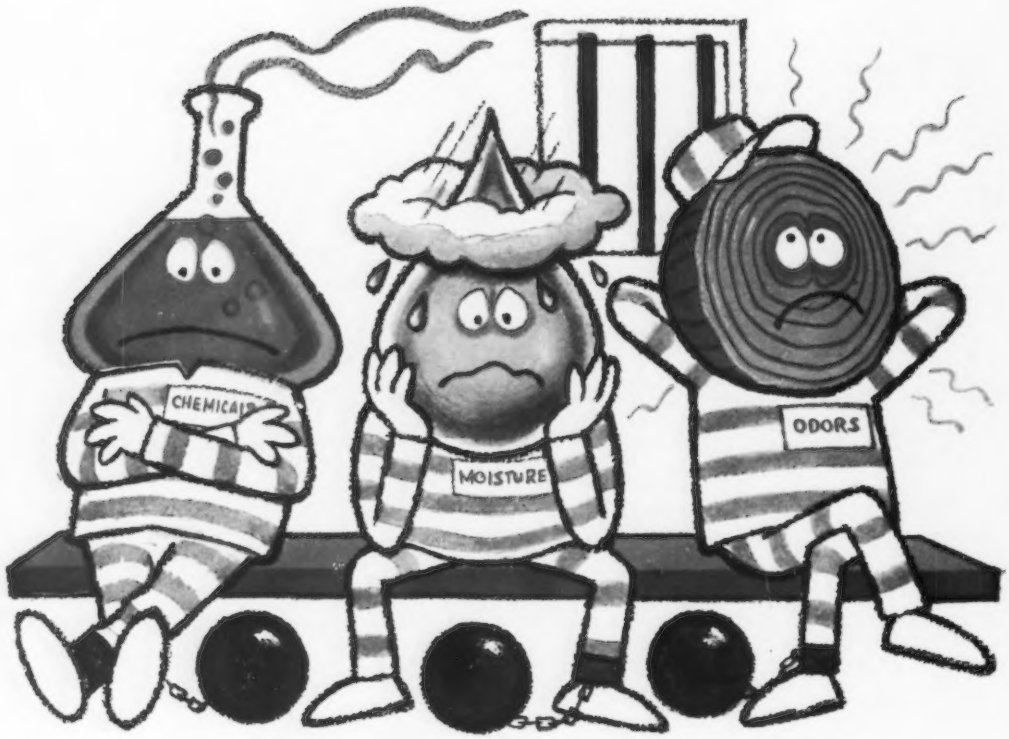

NEW LATEX FOR COATING

RESYN® 3600

POLYVINYLIDENE CHLORIDE

RESYN 3600 is a water dispersed polyvinylidene chloride that promises a revolution in protective coatings. For the first time, it combines exceptional barrier properties with simple low cost application by high speed coating machines or spraying. It offers important new advantages:

MOISTURE—Moisture vapor transmission is 2½ to 5 times lower than that of polyethylene. **ODORS**—Resistance to transmission of common gases 1000-2000 times greater than polyethylene. **CHEMICALS**—Almost complete non-reactivity to concentrated acids, solvents, alkalies and other corrosive materials. Grease and oil penetration is nil. Fire retardancy is excellent.

RESYN 3600 can be coated on paper, paperboard, plastic and other substrates. It also may be applied to fibers. It is of interest to a broad range of industries, including food and other types of packaging, converting, chemical, and textile.

Experimental lots of RESYN 3600 are now available. A 14 million lb. plant will be on stream this fall. Write for information.

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And All Principal Cities in the United States, Canada, England and Mexico

Cluster of 5 Grinnell-Saunders Valves in electrolytic plant of the S. D. Warren Company, Cumberland Mills, Maine, where chlorine solution is made. The 5" rubber-lined Grinnell valves with rubber diaphragms are on lines going from storage tanks to hardwood bleach. Valves here have been in use 9 years with very little service required.

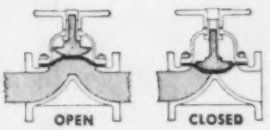
In use on chlorine lines 9 years with practically no maintenance!

It's the design of the Grinnell-Saunders Diaphragm Valve, plus selection of the correct body and diaphragm materials, which make it long-lasting.

The product in process is isolated from the valve's working mechanism at all times, so there can't possibly be any corrosion from that source. No product contamination can occur through contact with the operating mechanism, because the diaphragm effectively "seals off" the fluid in the line. The only part of the valve normally subject to wear is the diaphragm — which can easily be replaced without removing the valve from the line.

You can have Grinnell-Saunders Diaphragm Valves in a wide choice of body, lining and diaphragm materials. For further facts about Grinnell-Saunders Diaphragm Valves, see Grinnell's insert in Chemical Engineering Catalog, or Sweet's Plant Engineering File — or write directly to Grinnell Company, Providence 1, Rhode Island.

In the "open" position, the diaphragm lifts high for streamline flow in either direction.



In the "closed" position, the resilient diaphragm seals tightly, even over fibrous particles and grit.

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GRINNELL COMPANY, PROVIDENCE 1, R. I. • BRANCH WAREHOUSES AND DISTRIBUTORS FROM COAST TO COAST
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Quality=Dryden

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"Dryden is the new standard by which all pulps are compared."

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PUBLISHED WEEKLY SINCE 1872

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REMEMBER THESE DATES

October 5-7, TAPPI Deinking Conference, Conway Hotel, Appleton, Wis.
October 17-21, National Safety Congress, Conrad Hilton Hotel, Chicago.
October 24-28, TAPPI Engineering Conference, Hotel Robert Meyer, Jacksonville, Fla.

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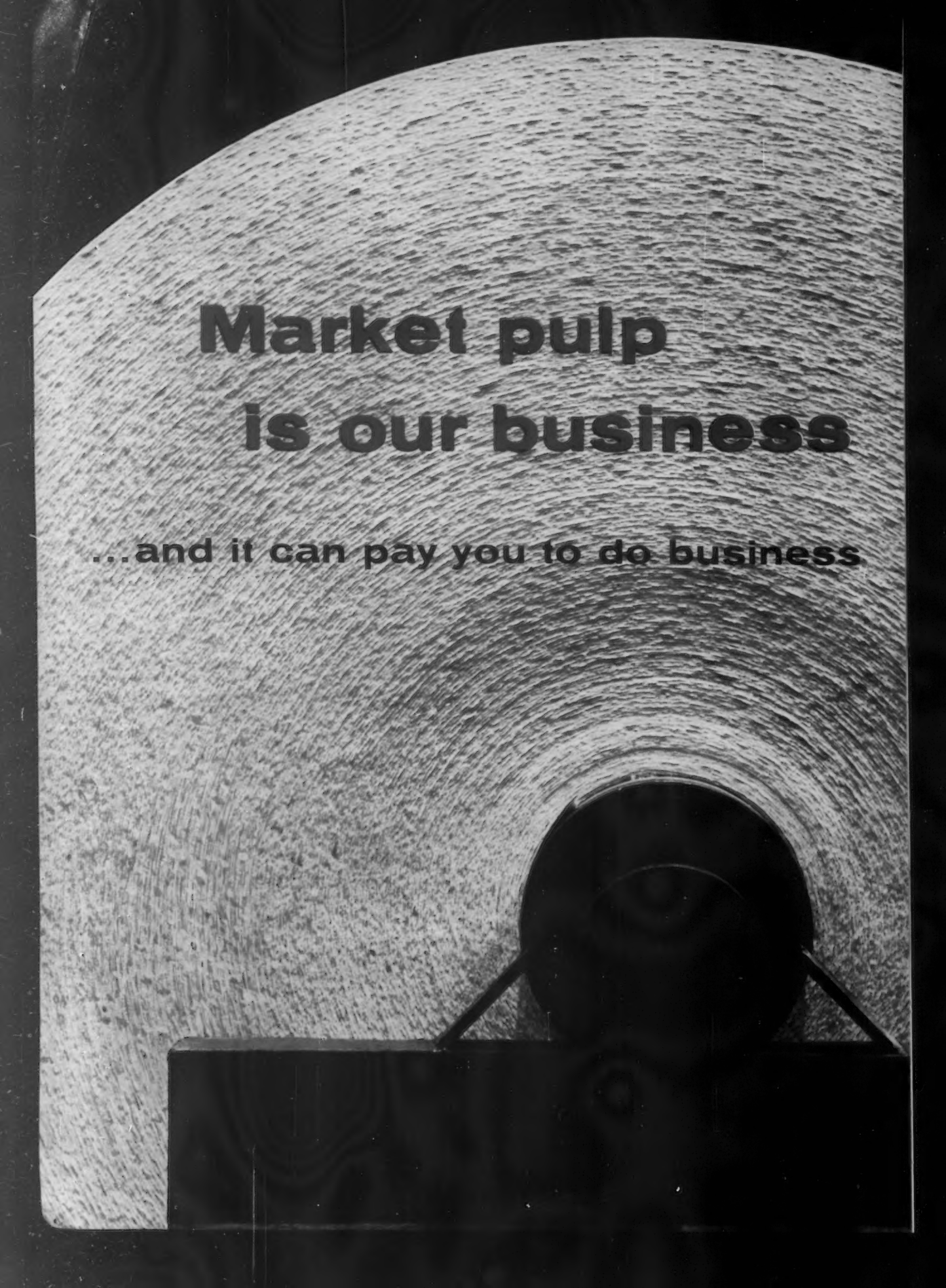
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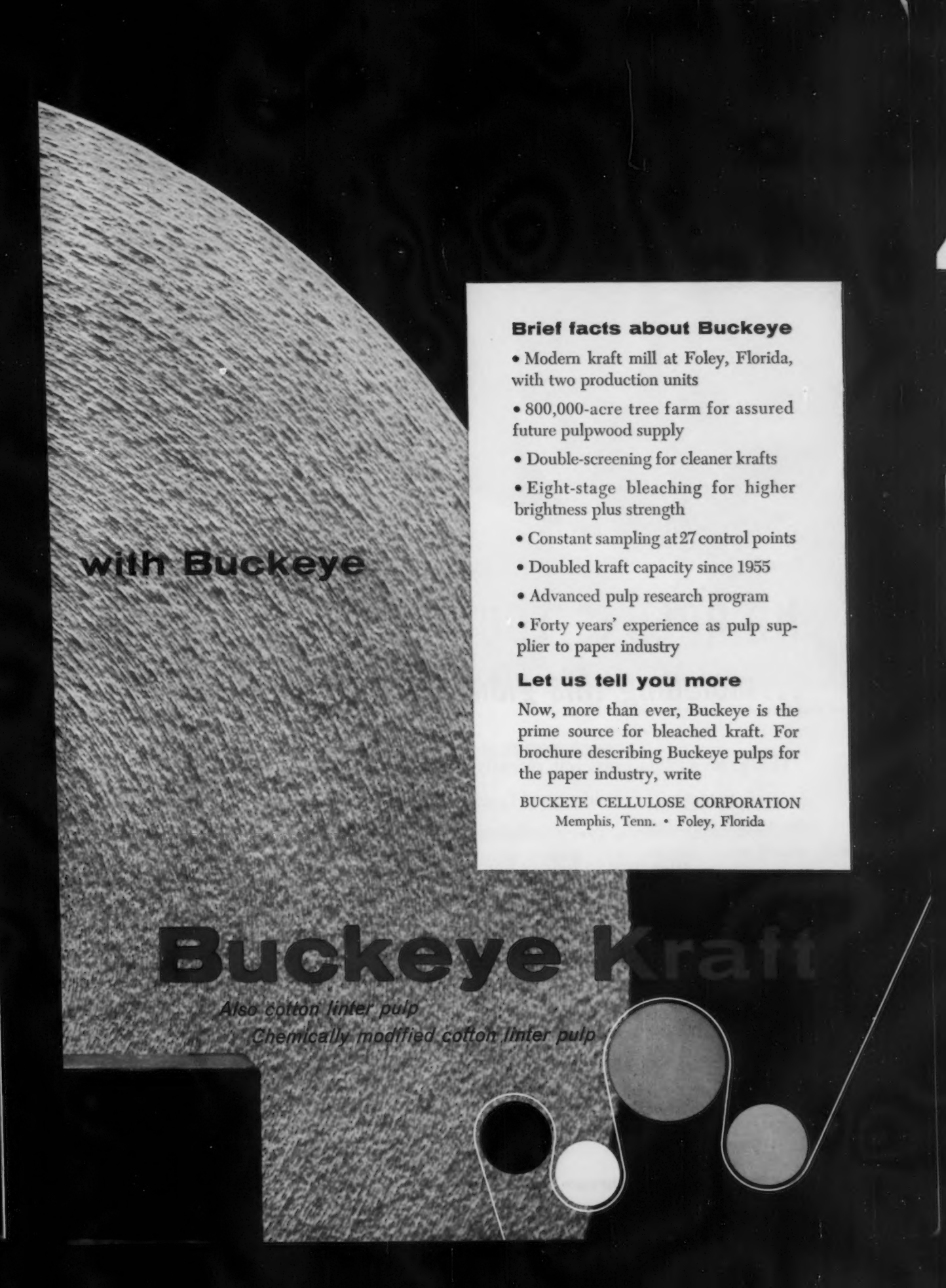

Brief facts about Buckeye

- Modern kraft mill at Foley, Florida, with two production units
- 800,000-acre tree farm for assured future pulpwood supply
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- Eight-stage bleaching for higher brightness plus strength
- Constant sampling at 27 control points
- Doubled kraft capacity since 1955
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Let us tell you more

Now, more than ever, Buckeye is the prime source for bleached kraft. For brochure describing Buckeye pulps for the paper industry, write

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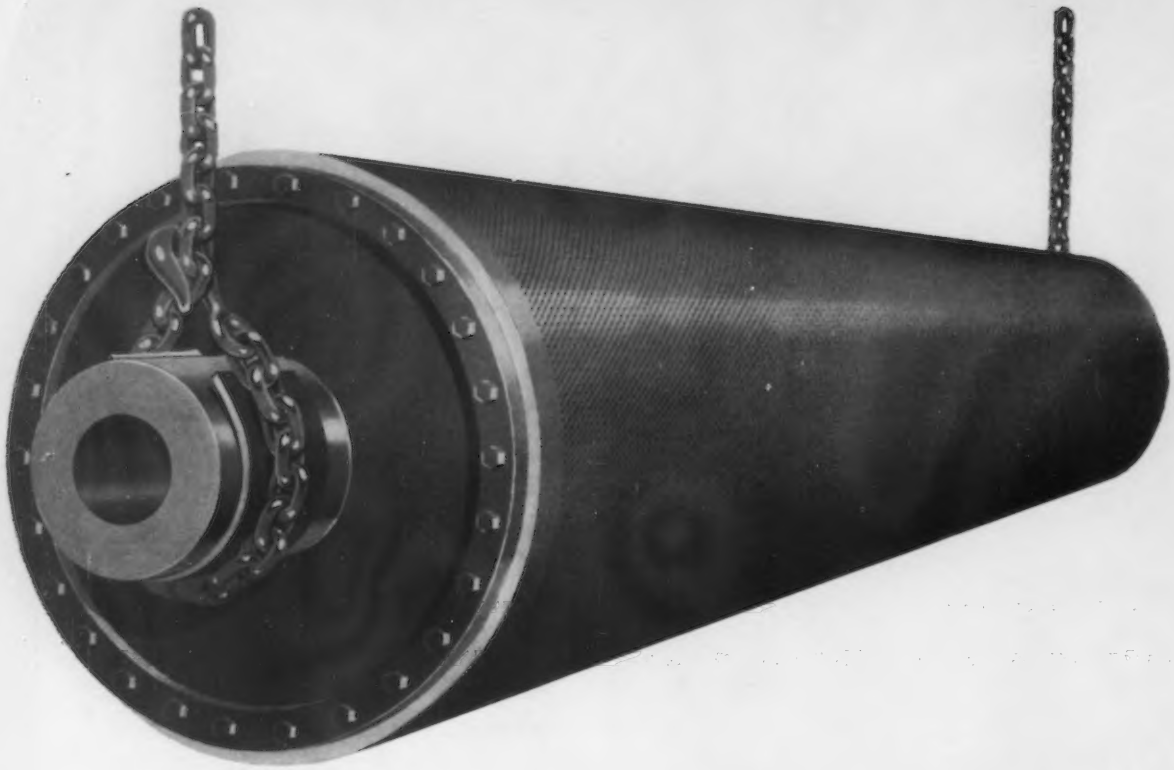

NO ROLL IS TOO BIG FOR TYER

...including this giant suction press roll

This giant suction press roll, recently shipped to a leading New England paper mill, is evidence of Tyer's ability to meet *any* paper-making roll requirements. Tyer's facilities are capable of handling the largest rolls used in today's high speed machines.

As a result of constant and intensive research and development, special Tyer manufacturing processes and bonding agents insure extra-long life, and trouble-free performance.

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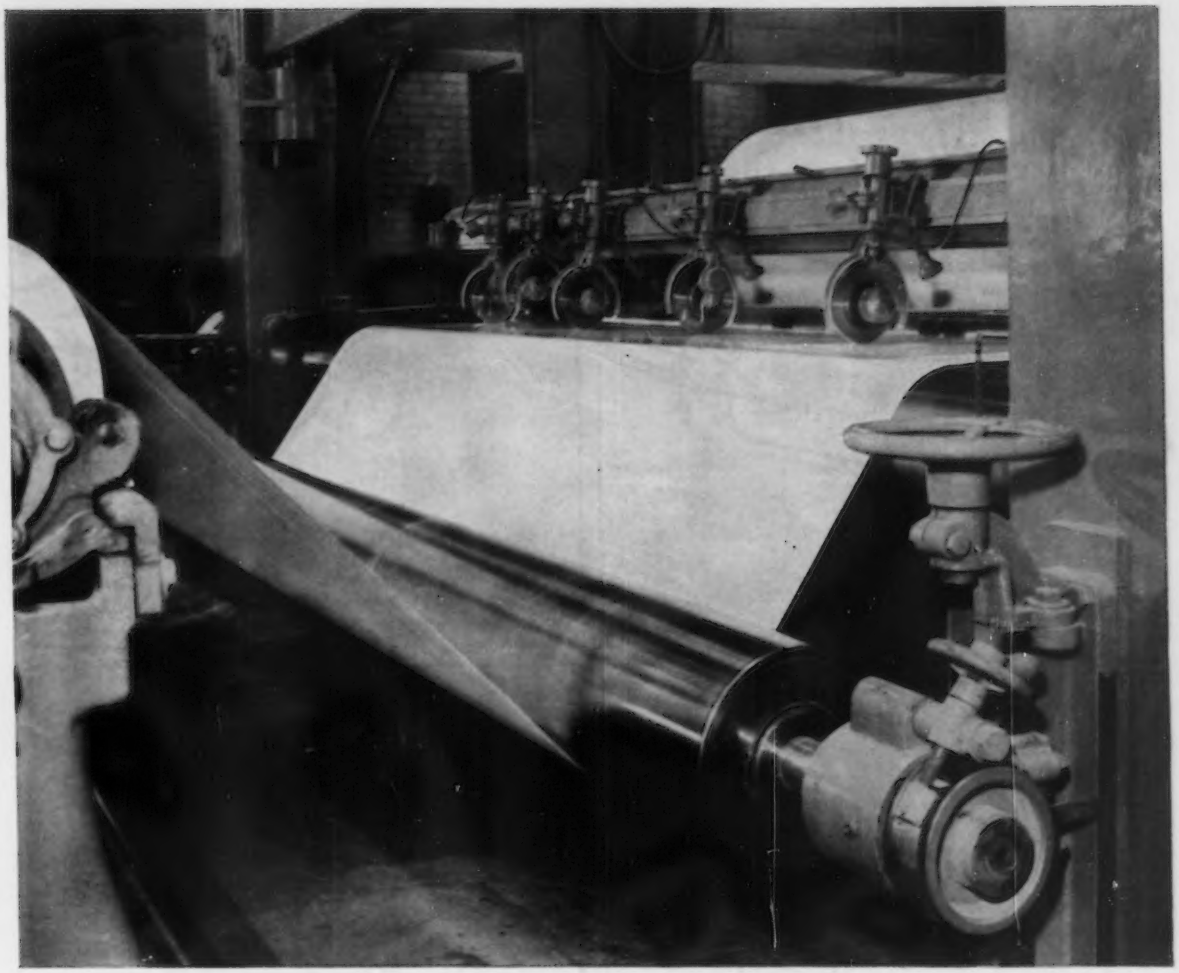

S. P. CHRISTENSEN

Oxford Paper Company, Rumford, Maine

Improved slitter arrangement

The slitter arrangement pictured above materially increases slitter life and makes slitter settings simpler and faster. This new slitter design incorporates a preset shear angle between top and bottom slitter, plus other improvements which result in a 200 to 300 per cent increase in slitter life. This new arrangement also insures correct slitter setting, with a 50 per cent reduction in slitter resetting time and less attention from the operator. This arrangement is the result of two years' development and is now standard on all Beloit winders.

FINISHED PRODUCT PROCESSING EQUIPMENT

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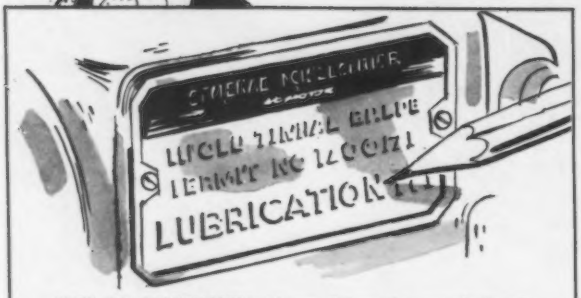
DISTRIBUTOR DAN, the SKF bearing man, offers

FIVE TIPS ON BEARING LUBRICATION

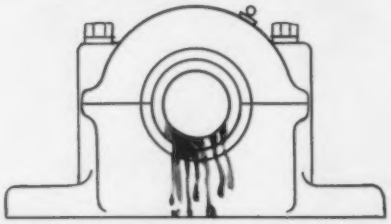
—that can save time and trouble for you



WHEN TO RE-LUBRICATE? Always follow the manufacturer's directions, if they're available. Most bearings, whether oil- or grease-lubricated, need cleaning and re-lubrication once a year. Re-lubricate oftener if the bearing is large, operates at high speeds or temperatures of 120-140 F. or higher.

WHAT GREASE CAN TELL YOU. Grease itself can tell you when cleaning and re-lubrication are needed. Dark grease means that oxidation has started or that abraded particles are present. Changes in the original color indicate water. Grease of a hard consistency should always be replaced.

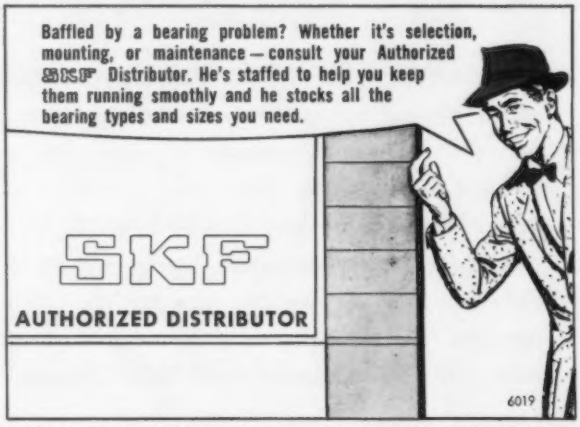
WHEN TO CHANGE OIL. Compare the oil in the bearing with unused oil. Clouded oil indicates water. Dark oil frequently indicates sediment. Dark, pitch-like coatings on the rings, roller ends or cage mean the oil has become dirty or begun to carbonize. So, clean the bearing and housing and re-lubricate.



TOO MUCH IS WORSE THAN TOO LITTLE. Don't overlubricate. Only grease that actually contacts the bearing lubricates. Using too much grease may cause churning and lead to overheating and loss of lubricant. Remember: the higher the speed, the more sensitive a bearing becomes to excessive lubrication.

CLEANLINESS, FIRST AND LAST. Clean new oils and greases will usually force-out old lubricants in the bearings. But they won't if the lubricant is badly oxidized. Pour a hot aqueous emulsion into the housing. Rotate shaft until bearing is clean. Drain solution while rotating shaft. Then, flush with hot light oil, drain and add new lubricant.

Baffled by a bearing problem? Whether it's selection, mounting, or maintenance—consult your Authorized SKF Distributor. He's staffed to help you keep them running smoothly and he stocks all the bearing types and sizes you need.



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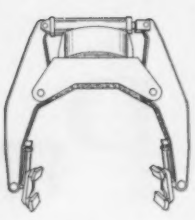
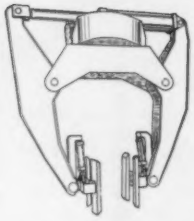
Handles rolls like a giant hand. Picks them up from horizontal position and sets them down vertically or vice versa. Holds them firmly even with power off.

HYDRAULIC ROLL GRAB WITH OUTSTANDING FEATURES

- Simplified Construction
- Dependable Grip
- Power-Fail Safety
- 90° Roll Turn-Over
- Adjustable to Roll Sizes



Present designs take rolls to 60 inches. Larger ones can be built.



Rolls with diameters as small as 18 inches can be handled.

THIS roll grab has been designed by Cleveland Tramrail engineers for heavy duty service. It is available for picking up and carrying rolls weighing to 6000 lbs. It will accommodate roll diameters from 24 to 60 inches and lengths from 36 to 120 inches.

The grab's construction is based on Cleveland Tramrail's long experience in the handling of rolls. More than 30 years ago Cleveland Tramrail developed the first power-operated roll grab and has been making improvements ever since. Many mills and converters are now being served by Cleveland Tramrail roll grabs and overhead cranes and track systems. In some, rolls are piled over 40 feet high with this equipment, thus *saving floor space, reducing roll damage* and *cutting costs enormously.*

A big advantage of the hydraulic roll grab is its simplified construction which aids operation and minimizes maintenance. The grab has a powerful grip which will hold rolls firmly and, even if the power should be interrupted, will retain its hold for hours. Rolls can be turned from horizontal to vertical position and vice versa. The grab is sold for use only on Cleveland Tramrail systems especially designed for roll-handling service.

CLEVELAND TRAMRAIL

Overhead Materials Handling Equipment

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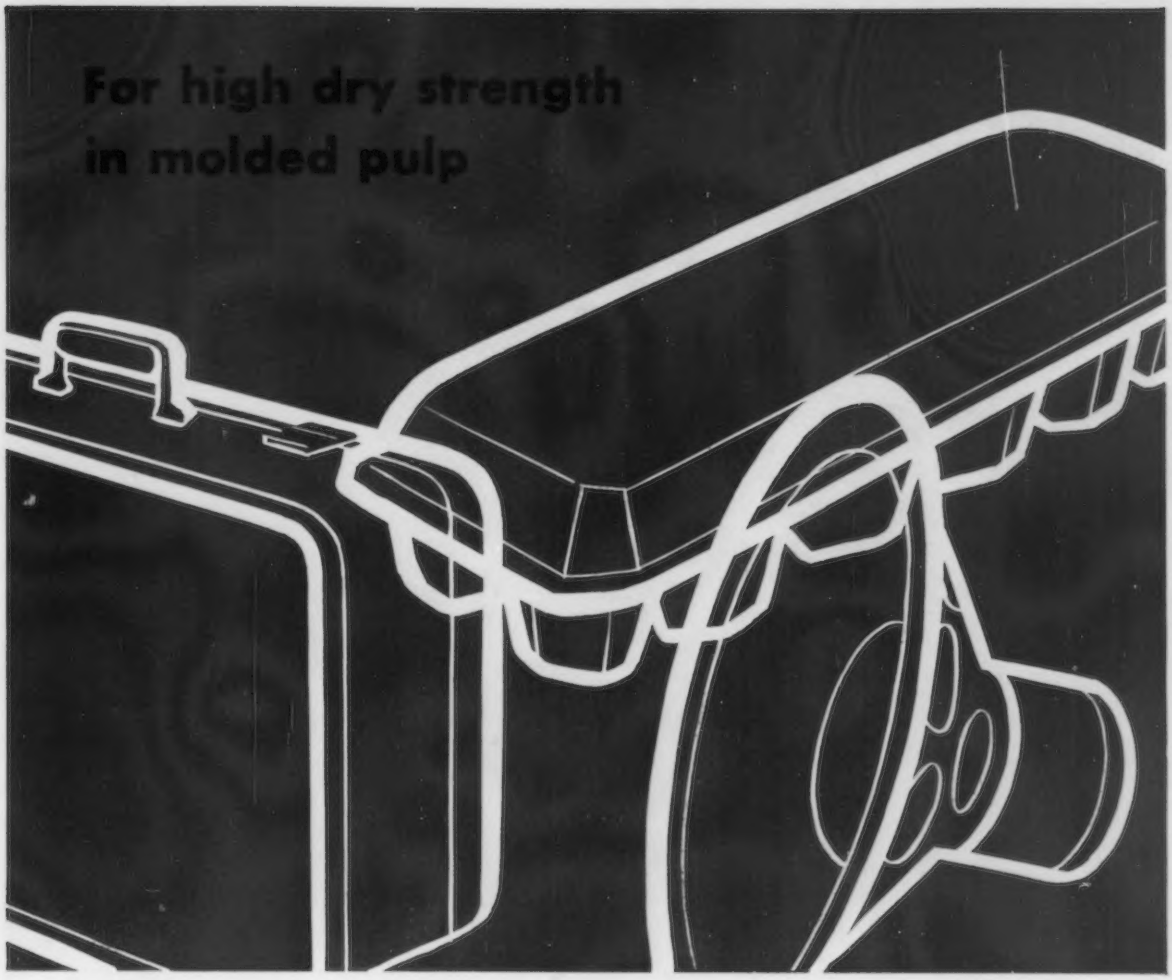

Shawinigan GELVA® polyvinyl acetate emulsions

When toughness and rigidity are properties necessary in your molded pulp products investigate GELVA emulsions. Substantially increased strength and stiffness can be obtained with relatively small quantities of emulsion. The chart, right, presents data based on laboratory tests performed with three GELVA emulsions representative of Shawinigan's diversified line.

Shawinigan's products for paper applications include both GELVA polyvinyl acetate emulsions and resins and GELVATOL polyvinyl alcohol resins. A wide variety of standard grades is always available. Shawinigan's research staff and laboratories are ready to assist you with formulations for special applications. Write to Shawinigan Resins Corporation, Dept. 7S, Springfield 1, Massachusetts.

	% Resin add-on (dry)	Flexural Strength lbs/in²	Relative Rigidity	Gain in weight 24 hrs water immersion at 25°C.
Control — no resin additive	0	3000	1.00	240%
Gelva Emulsion S-51	10	6330	1.97	115%
Gelva Emulsion C-3	10	5520	1.91	140%
Gelva Emulsion S-55	10	4480	1.43	136%

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GELVA® *polyvinyl acetate emulsions by* SHAWINIGAN RESINS

They're both blowguns, but...

each is in a class by itself . . . like Wyandotte's PURECAL® O

The *method* of use is the same for a pea shooter or a blowgun . . . but one is used in fun, and the other in deadly earnest. Makes all the difference in the world when you're on the receiving end!

In calcium carbonates, it's the *method* that makes the difference. And Wyandotte PURECAL O — the calcium carbonate that's in a class by itself — is precipitated by a special process which consistently yields agglomerate-free particles of cubical shape. It is a product of exceptional purity, uniformity, and whiteness.

One result: With PURECAL O, it is possible to prepare high-solids pigment slips that retain the low viscosity so essential to successful high-speed "on-the-machine" coating.

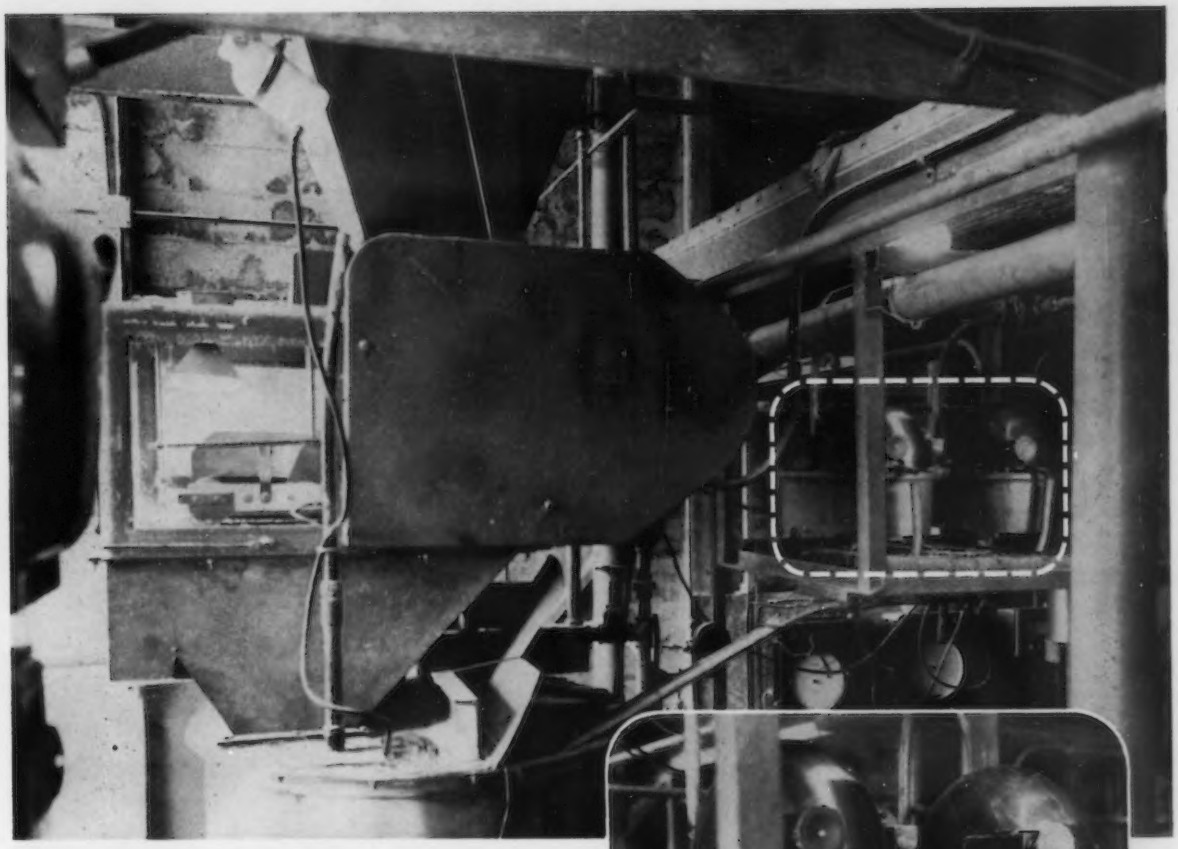
And PURECAL O offers you countless other advantages because of its unique physical properties. A thorough evaluation in your own laboratory will bring them to light — so write for samples and technical data, today. *Wyandotte Chemicals Corporation, Dept. 756-J, Wyandotte, Mich. Offices in principal cities.*

Wyandotte CHEMICALS

MICHIGAN ALKALI DIVISION

PACING PROGRESS WITH CREATIVE CHEMISTRY

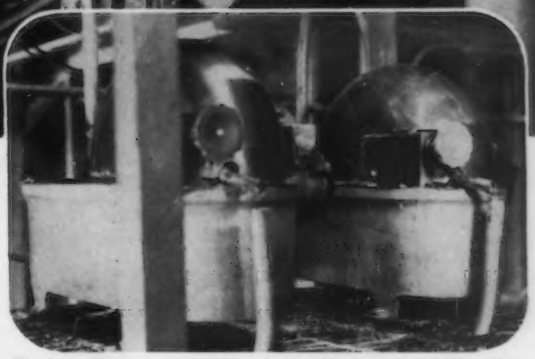
CLARKSON FEEDERS...simple, precise control for liquid feeding from a few drops to litres per minute!



Clarkson gravity type feeders are the most economical, efficient and dependable method for proportioning liquid chemicals to the main process flow. Precise manual control or automatic control with lineal motor using plant instrument air.

Compact as a portable radio and installed as easily, the electrically-operated Clarkson Feeder plugs into any outlet. Rugged, durable, lightweight construction. Stainless steel used throughout for all wetted parts. Inert plastic model available for acids and extremely corrosive liquids.

Clarkson Feeders are used by more than 1500 plants throughout the world . . . some operations with a few feeders, other with many hundreds. Clarkson Feeders provide a service of economy and efficiency at low initial and operation cost.



Clarkson Feeder, operating singly, feeds up to 760 gallons per day. Multiple units off a common motor increase capacity, combine or distribute flow to several process points. In paper processing plant, photo above, one feeder adds enzyme and the other acetic acid for continuous enzyme starch cooling for size press. Same plant also uses Clarkson Feeders for adding defoamer and slimicide at wet end of paper machine and liquid flourescent dyes to cooked starch at size press.

WRITE FOR BROCHURE

PRODUCTS

THE CLARKSON COMPANY

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OTHER PRODUCTS: PROPORTIONING PUMPS • SLURRY VALVES

"DYLEX® K-52 latex reduces titanium content 40% in our paperboard coating!"

says Bert Bushnell, Technical Supervisor for New Haven Board & Carton Company.

"This outstanding latex has saved us a lot of money," says Mr. Bushnell. "We've reduced costly titanium content 40%, substituted much less expensive clay coatings, and yet we've improved our coating brightness by 4 points. Another thing we like about Koppers is their customer service. Shipments are always on time and Koppers is ready to help us in our product development and production techniques."

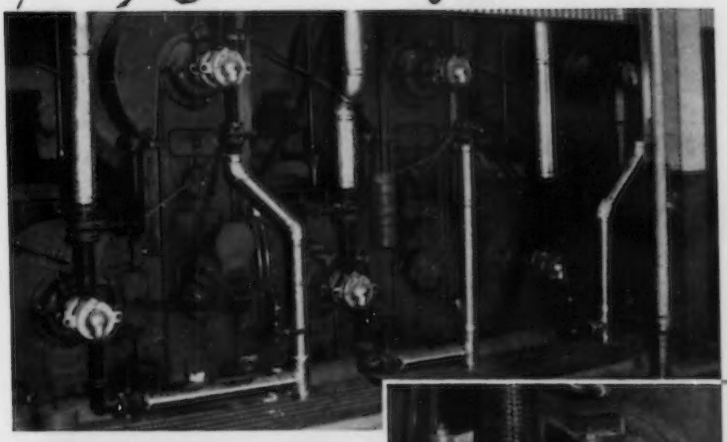
DYLEX K-52 gives paperboard a flexible latex coating. When bent or scored, the coating won't crack or dust. It dries fast and it won't flake off the paperboard surface. DYLEX K-52 gives paperboard a smooth, attractive appearance and improved printability. Color illustrations and typography reproduce with remarkable sharpness and clarity. This latex coating increases the sales appeal of your paperboard package. DYLEX K-52 also gives paperboard a high gloss, superior surface adhesion, and excellent mechanical stability.

Get complete information about latex coating. Call our local sales representative or write for our free pamphlet on DYLEX K-52 . . . complete with charts and test data. Koppers also produces DYLEX® K-54 and DYLEX® K-85 for the paper industry. Contact Koppers Company, Inc., Plastics Division, Pittsburgh 19, Penna.

KOPPERS PLASTICS KOPPERS

For New Paper Machines... or making old ones like new!

Be sure to specify Johnson Rotary Pressure Joints



First of all, with Johnson Joints you can expect trouble-free service and long operating life unmatched by any other method of getting steam into dryer rolls.

More importantly, Johnson Joints often hold the key to higher operating speeds and pressures, and to improved methods of roll drainage. They make possible a higher level of over-all performance and efficiency.

All machinery manufacturers can furnish Johnson Joints. There are sizes, types, mountings for all paper machines—either stationary or rotating syphon pipes—and for calenders and corrugators, too.

Try a pair 90 days in your mill; no obligation. Write for information.

Two more with JOHNSON JOINTS *-one new, one rebuilt*

Here's a brand new paper machine (top) built by Beloit Iron Works, and one that's been rebuilt by Beloit. The new machine is in a midwest mill, has 61 Johnson Joints. The rebuilt is in a Pacific northwest mill, has 54 Johnson Joints. These are Type L-N Joints, for high speed machines with rotating syphon pipes; all internal parts, including syphon pipe, rotate as a unit. Other features:

SUPER CONSTRUCTION —
Rock-hard "Green Streak" seal rings, plus special process Ni-Chrome plating, slash friction and wear.

"QUICK RELEASE" NIPPLE —
Easy on, easy off.

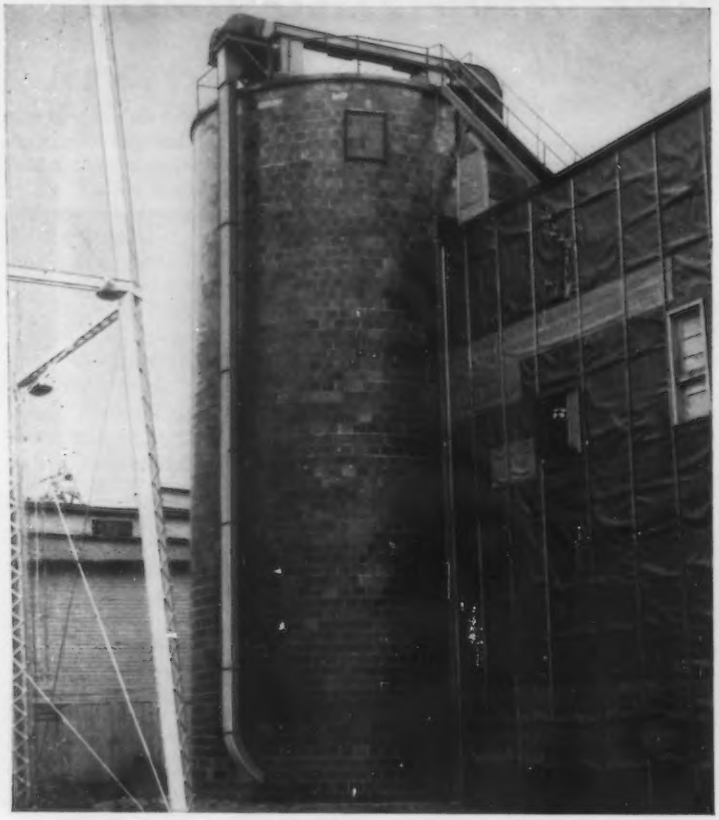
ROD SUPPORTED —
Weight of housing, piping carried by support rods. Rotating assembly literally "floats" inside.

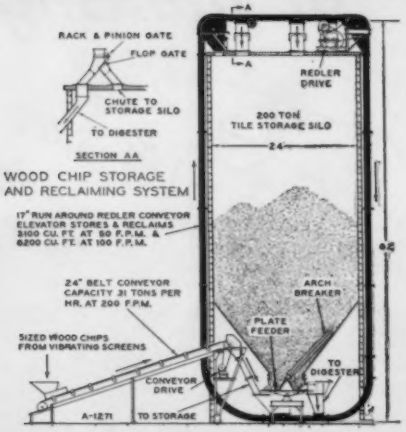
THE JOHNSON CORPORATION

828 WOOD STREET • THREE RIVERS, MICHIGAN

Rotary Pressure Joints • Direct Operated Solenoid Valves

STEPHENS-ADAMSON

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FLOP GATE
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TO DIGESTER
SECTION AA
WOOD CHIP STORAGE AND RECLAIMING SYSTEM
17" RUN AROUND REDLER CONVEYOR ELEVATOR STORES & RECLAIMS 3100 CU. FT. AT 50 F.P.M. & 6200 CU. FT. AT 100 F.P.M.
24" BELT CONVEYOR CAPACITY 31 TONS PER HR. AT 200 F.P.M.
SIZED WOOD CHIPS FROM VIBRATING SCREENS
CONVEYOR DRIVE
A-1271
TO STORAGE
REDLER DRIVE
200 TON TILE STORAGE SILO
24'
ARCH BREAKER
PLATE FEEDER
TO DIGESTER

Flow of material diagram above shows a wood chip storage and reclaiming system engineered by Stephens-Adamson.

The S-A triple chain log conveyor picks up logs from a woodyard flume and starts them on their way to the chipper.

EFFICIENT, PROFITABLE LOG & WOOD CHIP HANDLING

The digesters discharge chips into a hopper equipped with a 5-foot diameter two-stage circular bin discharger shown above. Arch-breaker arm keeps chips flowing through discharge outlet.

Arch-breaker arm inside circular bin discharger, above, insures steady flow of chips to REDLER conveyor-elevator.

Over a half century of know-how has been applied by STEPHENS-ADAMSON in engineering and building the most efficient and profitable paper pulp handling systems for storing, reclaiming and conveying to processing. S-A engineering ingenuity is displayed in the efficient handling of logs and wood chips in the paper pulp application illustrated.

From the triple chain log conveyor picking up logs from the woodyard flume to the steady feed insured by the circular bin dischargers at the discharge hoppers of the digesters . . . from the vibrating screen to the vertical closed-circuit REDLER lifting chips 62 feet to discharge points in the silo . . . S-A engineering know-how is applied to save time — cut costs and speed profitable material handling for the pulp and paper industry.

Write for Bulletins 358 and 250

S-A
ENGINEERED BULK HANDLING SYSTEMS
MATERIALS HANDLING PRODUCTS
SPEEDWALK® PASSENGER CONVEYORS
SEALMASTER® BALL-BEARING UNITS
SPHERCO® BEARINGS & ROD ENDS

ENGINEERING DIVISION
STEPHENS-ADAMSON MFG. CO.
GENERAL OFFICE & MAIN PLANT, 42 RIDGEWAY AVENUE, AURORA, ILLINOIS

PLANTS LOCATED IN: LOS ANGELES, CALIFORNIA • CLARKSDALE, MISSISSIPPI
BELLEVILLE, ONTARIO

BRIGHTNESS SUPREME... ACID STABLE LEUCOPHOR C FOR BRIGHTER WHITES. It's the first all-purpose optical brightener to produce maximum brightness in the beater and in the tub. Excellent stability over the entire pH range eliminates the need for buffers and enables you to re-use white water containing alum and free acid. With wet-strength resins, there's no precipitation, no yellowing or loss of brightness. Improved sizing at a low pH of 4-5 gives maximum retention of fines and better uniformity on both sides of the paper. See the reverse side of this ad for additional information, and call Sandoz for a demonstration at your earliest convenience. Sandoz, Inc., 61-63 Van Dam Street, New York 13, N. Y., Algonquin 5-1700. District Offices: Charlotte; Cincinnati; Fair Lawn, N. J.; Hudson, Mass.; Los Angeles; Philadelphia.

SANDOZ

THINKS AHEAD WITH PAPER

SANDOZ

FOR TOP BRIGHTNESS WITH TOP SAVINGS

apply Sandoz Leucophor C—

- in the beater • in the size press
- in spraying or dipping • in coating

In hard-sized papers and paper containing wet-strength resins, Leucophor C fully satisfies the need for high acid stability. In clay-casein coatings and size press solutions it has outstanding alkali stability. And with given amounts of TSP or soda ash, you can add large amounts of Leucophor C for added brightness without yellowing.

Designed especially for the paper industry, Leucophor C is another example of how Sandoz research and complete service to paper pays off in outstanding performance. Call Sandoz and see—

LEUCOPHOR C:
all-purpose optical brightener

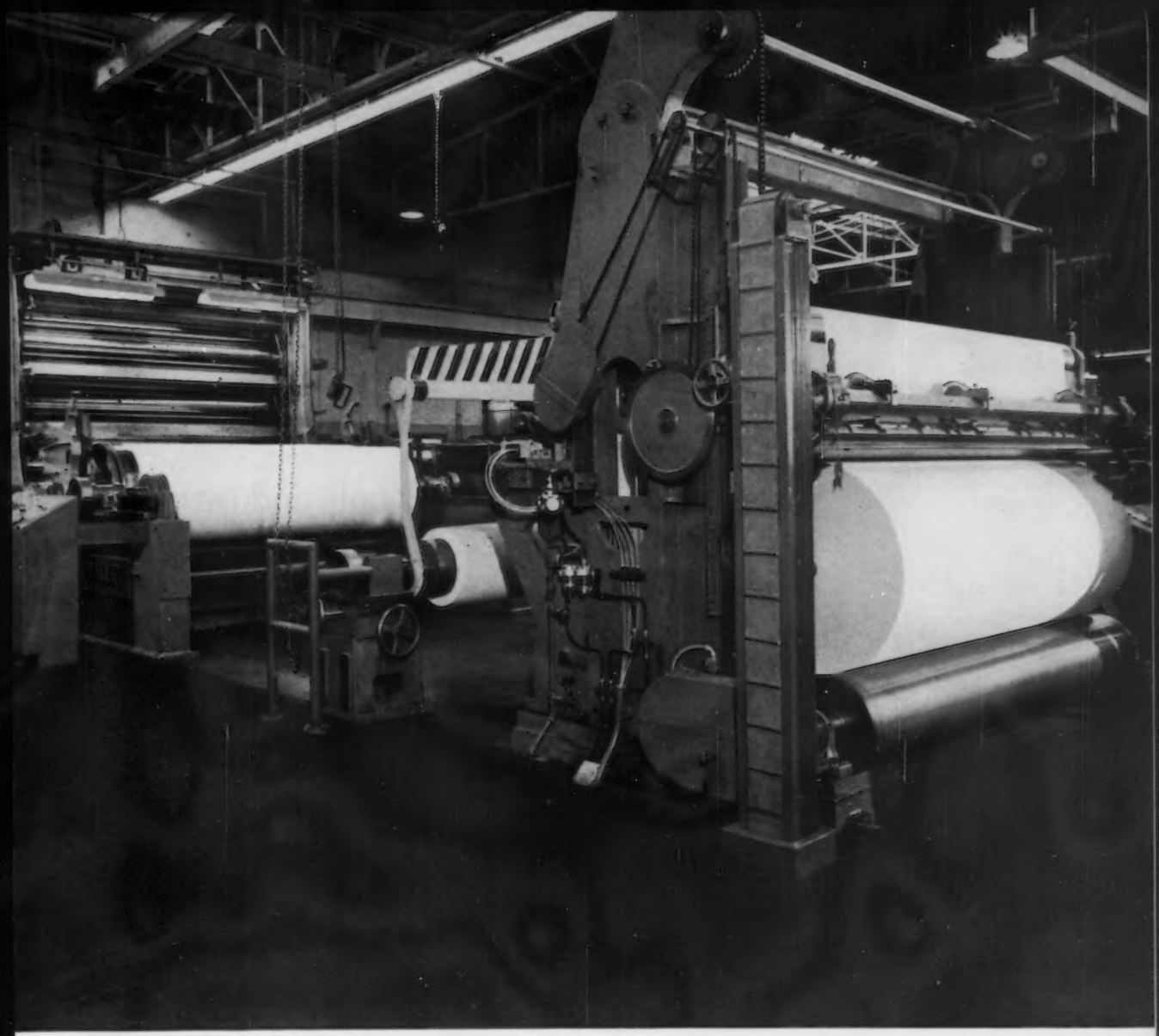
- Widest pH range (1-12)
- Excellent stability with acids, alkali, salts, and hard water
- No precipitation, yellowing, or loss of brightness
- Permits sizing at low pH for maximum retention of fines and better uniformity
- Compatible with anionic and nonionic compounds, fillers and shading pigments, direct and acid dyes
- Stable in storage at temperatures between freezing and 110° F.

Sandoz, Inc., 61-63 Van Dam Street, New York 13, N.Y. ALgonquin 5-1700
District Offices: Charlotte; Cincinnati; Fair Lawn, N.J.; Hudson, Mass.; Los Angeles; Philadelphia.

SANDOZ

THINKS AHEAD WITH PAPER

SANDOZ



Mill Modernizes...Eliminates Rewinding... Saves Time and Trouble

Extensive modernization by the Nekoosa-Edwards Paper Company includes the Kidder 110-inch Superspeed Mill Winder shown above — an important new installation at the Nekoosa plant.

In one operation this machine slits and winds rolls up to 60″ in diameter . . . operates at 3000 feet per minute . . . has a multiple disc, water-cooled unwind brake and automatic, pneumatic tension control.

Advantages like these will help you meet today's requirements for paper machine efficiency speed and cut your finishing room costs. For details write to Kidder Press Company, Inc., Dover, N. H. Eastern Sales Office: Empire State Bldg., New York 1, N. Y. Midwest Sales Office: 400 Washington Bldg., Madison 3, Wis. West Coast Representative: Bojanower Machinery Service Corp., 5270 E. Washington Blvd., Los Angeles 22, California.

Make Good Impressions Faster with

Kidder

Slitters and Rewinders, Flexoprinter®, Letterpress and Gravure Presses

HOW TO USE SALES PSYCHOLOGY IN ADVERTISING

Open letter to suppliers who serve the paper and pulp industry

Every good salesman knows that there are two important emotional factors that may affect a prospect's decision of what product to buy. One is positive, the other negative.

To take the negative first, a new prospect experiences fear – fear that your product may not work out and, therefore, reflect discredit on his judgment.

The positive factor is ambition – the desire to build stature, to demonstrate good buying judgment. This creates a desire to believe your statements about your product and what it can do to save or make money for his company.

How can your advertising cope with these basic psychological factors? The answer usually lies in assurance.

Consistent advertising, year after year, provides the best assurance to fearful and hopeful readers. But even new advertisers can overcome these obstacles when they present specific evidence that other mills make profitable use of their products.

Such evidence can be presented as a testimonial from a satisfied user, a case history of an interesting application, or a list of satisfied users. The method is up to your advertising people. But we would point out that the *principle* of assuring prospective buyers is a sound one, for it will help your salesmen close orders.

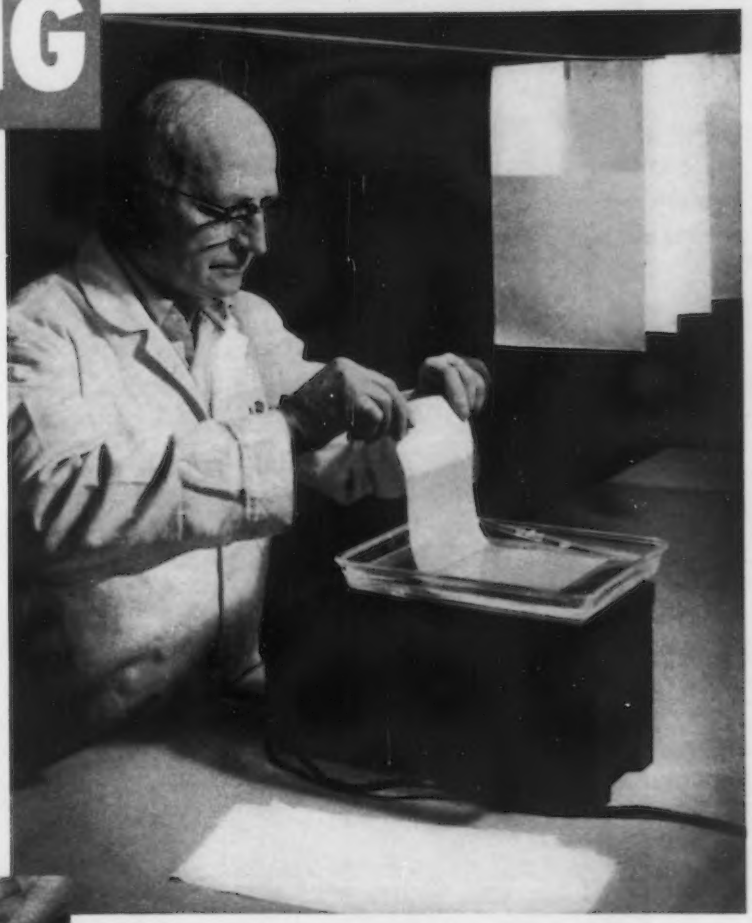
George E. Lockwood PUBLISHER

PAPER TRADE JOURNAL

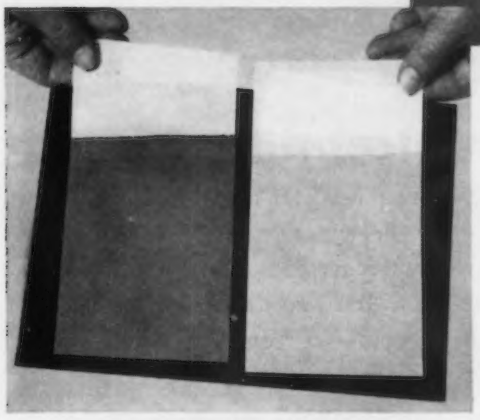
P.S. Most of the people who are reading this issue of PAPER TRADE JOURNAL, as you are now, are men who need to be assured that your product can do what you say it will. Are your company ads providing this assurance?

From the Paper Research Laboratory of The New Jersey Zinc Company
ONE of a Series of Test Procedures on Horse Head Titanium Dioxide

WAXING



Pigmented and unpigmented handsheets are dipped in molten wax and evaluated for opacity, brightness and other properties essential to modern high grade papers for use in food packaging.



Comprehensive studies on the effect of titanium dioxide on opacity and brightness of waxed papers for food packages are an important phase of the research activities at the paper laboratory of The New Jersey Zinc Company.

Such investigations involve the preparation of handsheets in various weights—pigmented and unpigmented—the application of commercial wax coatings, and extensive evaluations for opacity and brightness.

The development of new knowledge on the advantages of Horse Head titanium dioxides in paper products is a prime objective of New Jersey Zinc research. It represents a continuing program. May we tell you more about it?

HORSE HEAD® TITANIUM DIOXIDE

THE NEW JERSEY ZINC COMPANY, 160 Front St., New York 38, N. Y.
Founded 1848

Also Distributed by BULKLEY DUNTON PULP CO. INC. • New York, N. Y. • Kalamazoo, Mich.

New Signode Compression Strapping Station

This skid of paper is being strapped on a Signode CS20-1 press, using the latest Signode methods. It will arrive at destination in top condition. Paper slippage in transit will be at an absolute minimum—85% less on the average than with other methods. The receiver will get more usable sheets of paper in every skid. He can use the paper directly from the skid without restacking. This mill has improved its product—yet reduced its costs per skid for time and materials.

Write today for all the facts about Signode strapping presses and tools for the paper industry... and for the facts about the money-saving advantages of strapping the Signode way.

SIGNODE

First in steel strapping

SIGNODE STEEL STRAPPING CO.

2677 N. Western Avenue, Chicago 47, Illinois

Offices Coast to Coast. Foreign Subsidiaries and Distributors World-Wide
In Canada: Canadian Steel Strapping Co., Ltd., Montreal • Toronto

PAPER TRADE JOURNAL
WEEK OF OCTOBER 3, 1960

Display by New York and Penn To Show Books of 36 Publishers

A unique book promotion display has been launched on the Main Concourse in Pennsylvania Station, New York, as part of a continuing effort by New York & Pennsylvania Co., Inc., manufacturer of fine book papers, to stimulate public interest in books.

The display, which is designed to give a feeling of open space, is divided into four individual exhibit areas. Each of these areas will show up to five books from a specific publisher over a seven-day period until the middle of November. In all, the works of 36 publishers are to be exhibited.

The exhibit marks the third phase of New York & Penn's book promotion campaign. Recently the company distributed over a half a million bookmarks to 1500 top-rated retail bookstores across the country. Prefaced with the question "Have you read these new books from . . .?"—the bookmarks listed titles from spring lists of major publishing firms. In addition, the company participated in "Weather Game" over WNTA-TV, a program in the New York metropolitan area which challenged viewers to predict the temperature at Manhattan's Battery during a five-day period. Leading books of various publishers were then offered as prizes.

N.J. Newsprint Mill Project Under Way

Plans for the newsprint mill of the Newark News in Garfield, N. J., are said to be progressing. It is reported that construction has started on this new newsprint mill which is to cost $4 million and be operated as Garden State Paper Co.

Initial output, it is said, will be 45,000 tons with a potential of 80,000 tons. Furnish will be 90 per cent deinked newsprint and 10 per cent chemical fiber. The deinking process is a new one developed by the Newark News. According to the New York Times the owners will take less than 10 per cent of the output and the balance will be sold at $10 less than the current market price.

Roderick O'Donoghue is consulting engineer for the project.

Allied's Business Form Div. Adds Mid-West Firm

William E. Bercaw, president of Allied Paper Corp's Business Forms Division, has announced the acquisition of the Charles E. Brown Printing Co., Kansas City, Mo.

In making the announcement, Mr. Bercaw advised "that although the Brown company has been a general printing firm for many years, its move into the rotary forms field made it of particular interest and value to Allied. Brown becomes the fifth rotary forms manufacturer to join Allied's Business Forms Division." Mr. Bercaw added, "giving allied the further geographic advantage of a facility in the growing Mid-America market.

The other Business Forms Division companies include: American Register Co., Boston, Mass.; Carmax Corp. Houston, Tex.; Stephen Green Co., Philadelphia, Pa.; and the Egry Register Co., Dayton, Ohio.

All the products of the Business Forms Division will be marketed by the newly formed Allied-Egry Business Systems organization.

Paper and Paperboard Production

The American Paper and Pulp Association reported the ratio of the United States paper production to mill capacity for the week ending September 17, 1960 at 92.4 per cent, compared with 72.6 per cent, revised, for the preceding week. The ratio was 98.5 per cent for the corresponding week a year ago.

The National Paperboard Association reported the paperboard production ratio for the week ending September 17, 1960 at 93 per cent, compared with 70 per cent for the preceding week and 98 per cent for the corresponding week a year ago.

(Detailed Statistics on page 60)

Lockwood to Represent La Papeterie

The Lockwood Trade Journal Co. has been appointed exclusive sales agent for La Papeterie in all countries other than France, according to George E. Lockwood, publisher of PAPER TRADE JOURNAL.

La Papeterie, published in Paris, is the leading French language technical magazine for the pulp and paper industry in France and Belgium. Though a monthly, it is roughly comparable in editorial content to PAPER TRADE JOURNAL in this country, with coverage of all mills and readership by men in mill production management positions. Circulation is concentrated in the Common European Market.

CPPA Technical Section Schedules Meeting

The 1961 Annual Meeting of the Technical Section, CPPA, will take place at the Queen Elizabeth Hotel, Montreal, January 24-27. Sessions will begin at 2:00 p.m. on Tuesday and will end at noon on Friday; the registration desk will open at 9:00 a.m. on Tuesday. A products display will be held concurrently with the meeting.

N. A. Newsprint Production Hits Historical High

Production of newsprint in North America during August 1960 amounted to 750,081 tons—a record high for this month—and was 4.9 per cent above the August 1959 volume. Shipments totaled 723,359 tons in August 1960 and were 3.5 per cent greater than shipments in the same month of 1959. According to the Newsprint Service Bureau, output in the United States of 179,908 tons surpassed that in any month on record while shipments totaled 171,527 tons, and respective gains over August 1959 amounted to 3.5 per cent and 2.3 per cent. Canadian production amounted to 570,173 tons while shipments totaled 551,832 tons, which represents increases over August, 1959 of 5.3 per cent and 3.9 per cent respectively.

Production of newsprint paper in North America in the first eight months of 1960 amounted to a record 5,797,862 tons, which was 330,043 tons or 6.0 per cent above the level attained in the same period of 1959. Cumulative output of United States mills at the end of August 1960 attained a historical high of 1,359,241 tons and was 57,802 tons or 4.4 per cent more than the volume produced a year earlier. Canadian production totaled 4,438,621 tons—an all-time peak level—and was 272,241 tons or 6.5 per cent greater than in the first eight months of 1959.

Warren Wins First Place In Annual Report Survey

S. D. Warren Co. has been selected for a first place award for having issued the best stockholder annual report for the Pulp and Paper Industry in the Twentieth Annual Report Survey sponsored by Financial World, national weekly magazine. Symbolic of the achievement, a bronze "Oscar of Industry" trophy will be presented to Edward B. Gray, treasurer of the company, on Monday evening, October 24, at an awards banquet in the grand ballroom of the Statler Hilton Hotel, New York City.

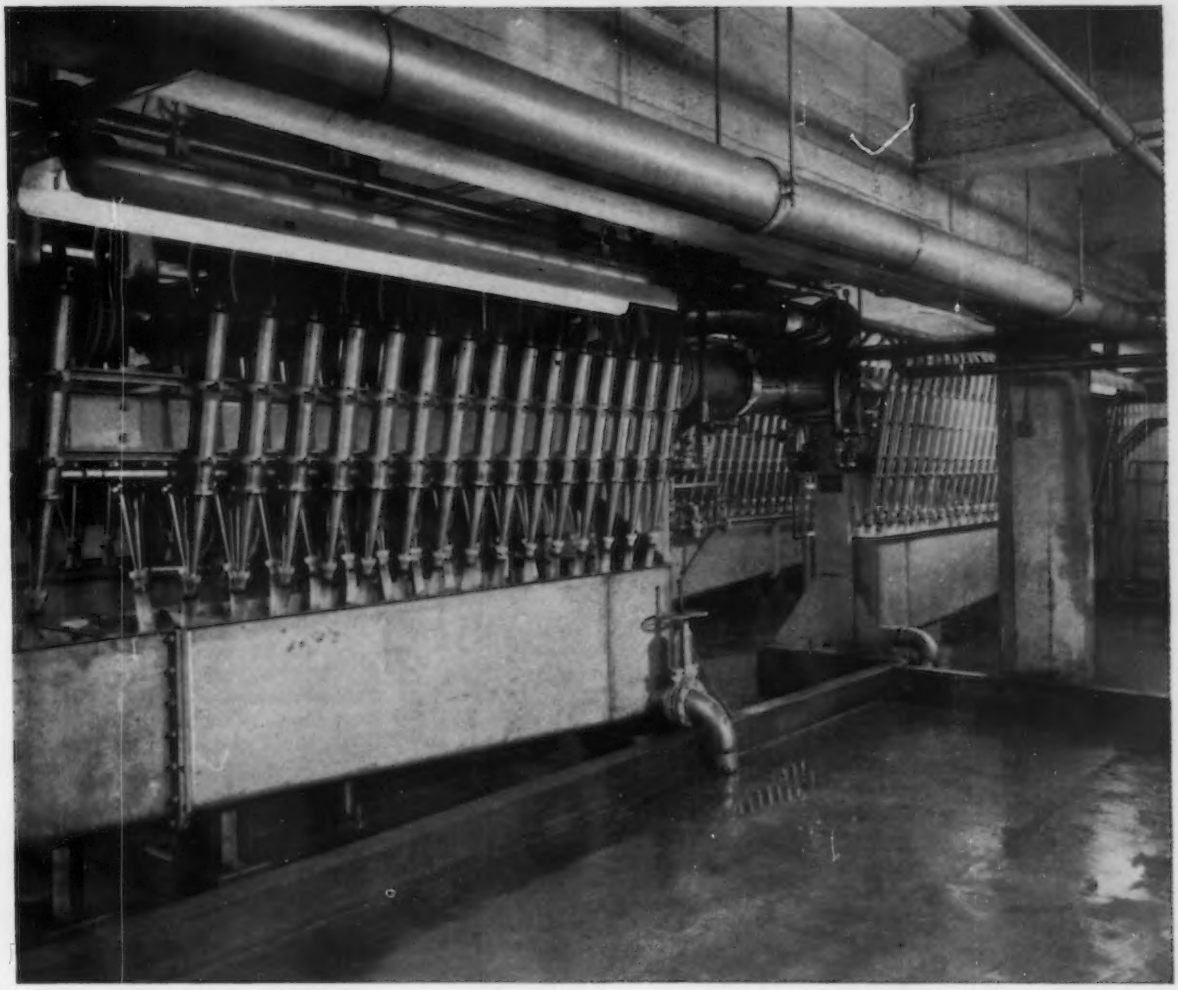
Close to 5,000 reports were reviewed in 96 categories during the 1960 competition. In the Pulp and Paper Industry classification, Abitibi Power and Paper Co. was runner-up for the top award, while Kimberly-Clark Co. placed third.

St. Regis Acquires Federal Container

St. Regis Paper Co. has completed its seventh acquisition of 1960, purchasing Federal Container Corp. of Minneapolis for an undisclosed number of shares. A manufacturer of corrugated boxes, Federal owns a 110,000-square-foot plant in a Minneapolis suburb and is planning to build a second plant nearby.

This year the company has either purchased or announced plans to purchase, in addition to Federal Container, the six companies that follow: Creamery Package Manufacturing Co.; American Sisalkraft Corp.; Sherman Paper Products Co.; Howard Paper Mills, Inc.; Central Waxed Paper Co. and National Kraft Container Corp.

"Are these the glasses you lost up by the headbox this morning."



Is YOUR stock as clean as BIRD CYCLEANS can make it?

Mills that are putting their stock through Bird Cyclean pressure drop cleaning units are not only making paper that is easier to sell but are getting production advantages that pay handsome dividends on the Cyclean investment — fewer rejects, fewer breaks, fewer washups, increased wire life — more as well as better paper per machine per day.

Ask us to show you what Cycleans can do for you.

BIRD MACHINE COMPANY

SOUTH WALPOLE, MASS.

REGIONAL OFFICES: EVANSTON, ILLINOIS
PORTLAND, OREGON • ATLANTA 9, GEORGIA

Canadian Manufacturers of Bird Machinery
CANADIAN INGERSOLL-RAND COMPANY, Limited, Montreal

PAPER PEOPLE

A. D. Burnside

D. L. Stocker

Columbia Pulp Sales Adds to Sales Staff

Columbia Pulp Sales, Ltd., sole distributor of Columbia Cellulose sulphite pulps and Celgar Kraft pulps, has announced the appointment of A. Deane Burnside to the pulp sales staff.

Mr. Burnside received a B.A. degree from the University of British Columbia in 1948. He brings to his new post a background in marketing and sales received at the Graduate School of Business Administration, New York University, and in a management capacity in the fields of advertising and sales promotion.

Mr. Burnside will work with Stanley A. Meighen, Western district manager, largely in the marketing of Celgar Kraft which will come on stream in December of this year from Celgar's new bleached kraft pulp mill in the Arrow Lakes region of British Columbia.

Chemical Fine Paper Promotes Three

Edmund J. Brogle, tour foreman at the Chemical Fine Paper and Board Division of the Standard Packaging Corp., has been named superintendent of the paper machine in the No. 2 plant of the company.

He succeeds John P. Riley who was promoted to general superintendent.

Replacing Mr. Brogle as tour superintendent is William E. Holden, machine tender.

Paper Chemistry Institute Elects Trustee

Dwight L. Stocker, president of KVP Sutherland Paper Co., was elected on September 13 to the board of trustees of The Institute of Paper Chemistry, Appleton, Wis. He will serve a five-year term, ending in 1965.

Between 1952 and January, 1960, Mr. Stocker was president of the KVP Co., which merged with Sutherland Paper Co. in January. He had previously been president and general manager of Michigan Paper Co. from 1936 to 1952.

Brown Names Manager Of New Division

Paul M. Goodloe, formerly director of research and development at Brown Co., has been named manager of a newly organized Chemical Products Division. The new division will encompass manufacture and sale of such chemicals as chlorine, caustic, muriatic acid and chloroform which are products of the company's electro-chemical plant at Berlin.

A second product line to be handled through the new division is Brown's Selectacel, a series of chemicals derived from cellulose with ion exchange properties. Grobark, Brown's horticultural product developed from composted bark, will also be handled in the new division.

Dr. Goodloe will continue in charge of research projects for other firms which utilize the extensive research and development facilities available at Brown, the announcement stated.

Emerson Morse of Brown's Research Department, who was largely responsible for the development of Selectacel, will assist Dr. Goodloe in the conduct and operations of the Chemical Products Division. Dr. Morse is a graduate of Bowdoin and the University of California and joined Brown Co. in 1948.

The announcement stated that George A. Day, technical director of Brown Co., would assume the duties of director of research. In this capacity Dr. Day will guide technical development programs throughout the company.

Meehan Moves To C-Z Bogalusa Plant

Thomas I. Meehan, resident manager of Crown-Zellerbach Corp.'s Carthage, N. Y., Division, is being transferred to the company's plant at Bogalusa, La., as assistant manager.

He will be succeeded by James B. Palmer, who came to Carthage in June as assistant manager. He had been superintendent of the corporation's bag factory in Camas, Wash.

R. P. McGinley

Penobscot Chooses Manager of Services

The appointment of Raymond P. McGinley as manager of services at its mills in Old Town, Me., has been announced by Penobscot Chemical Fibre Co.

Mr. McGinley comes to P.C.F. with wide experience. Since graduating from college he has been associated with the International Paper Co. in Livermore Falls, Me.; Tileston and Hollingsworth Paper Co.; Hamilton Paper Co.; Black and Clawson; and Standard Packaging Corp., Missisquoi Division, Sheldon Springs, Vt. It is from his position as plant engineer with Standard Packaging that Mr. McGinley comes to the P.C.F.

Scott Fills Posts At Everett and Mobile

Oliver Ronken has been promoted to the position of pulp mill production manager at Scott Paper Co.'s Everett mill. He will be responsible for the operations of the yard crew, the wood mills, the sulphite mill and the drying and finishing departments.

Mr. Ronken replaces John M. Carlson who recently retired after 30 years service.

Eugene B. Johnson, paper mill engineer at Scott's Everett mill has been promoted to the position of expansion engineer at the company's Mobile plant.

Mr. Johnson joined Scott in 1951 as an engineering trainee in the engineering department of the Chester plant.

Following that, he was transferred in 1954 to the staff engineering department, as a senior project engineer.

In 1956 he was transferred to Everett as a special projects engineer and later was made Everett paper mill engineer, his present position.

Harold Heinbuck has been appointed as process engineer with the Technical Department of the KVP Division, KVP Sutherland Paper Co., Kalamazoo, Mich.

Mr. Heinbuck is a recent graduate of the Michigan College of Mining and Technology, Houghton, Mich., with a B.S. degree in mechanical engineering.

Brandywine Paper Announces Appointments

Morris Blank, president of Brandywine Paper Corp., Downingtown, Pa., has announced that J. Frederick Bicking has been appointed as his assistant.

Mr. Blank also announced the appointment of Joseph Linsenman as mill and maintenance superintendent.

OBITUARIES

Irving Norman Frisby, 74, a retired sales executive for Nekoosa-Edwards Paper Co., died of a heart attack September 19 at his home in Wisconsin Rapids. Mr. Frisby had been associated with Nekoosa-Edwards for 40 years and was a sales representative for the firm for about 30 years.

2 ways Gates high capacity V-Belt Drives contribute to industry profits

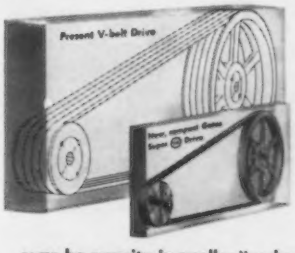
ON IN-PLANT EQUIPMENT, Gates Super HC V-Belt Drives lower maintenance costs—as on this pump at Scott Paper Company's Detroit plant. The pump was formerly driven by a special belt, but 6 of these belts failed in about 3 months. In comparison, a Super HC Drive has been operating for the past year with NO down time and NO replacement cost.

ON EQUIPMENT FOR SALE, Super HC High Capacity V-Belts produce savings all down the line—as on these sand pumps being readied for shipment from Denver Equipment Company's plant. With Super HC, sheave dimensions can be reduced 30% to 50%, overall space up to 50%, drive weight by 20%, and drive cost by as much as 20%, compared to previous drives.

A little more than a year ago Gates introduced a new high capacity V-belt—a slimmer, tougher, more flexible V-belt with far greater capacity to transmit horsepower than conventional belts.

Because this revolutionary V-belt permits narrower sheaves, fewer belts, and closer center distances, hundreds of plants across the country have found Gates Super HC V-Belt Drives contribute to profits in 2 ways: through marked savings in drive costs on production machines *within* the plant and on powered equipment manufactured *for sale*.

Gates V-Belt Distributors and Field Engineers are listed in the Yellow Pages in all major industrial centers. Ask your distributor for the handbook, *The Modern Way to Design V-Belt Drives.* TPA 544



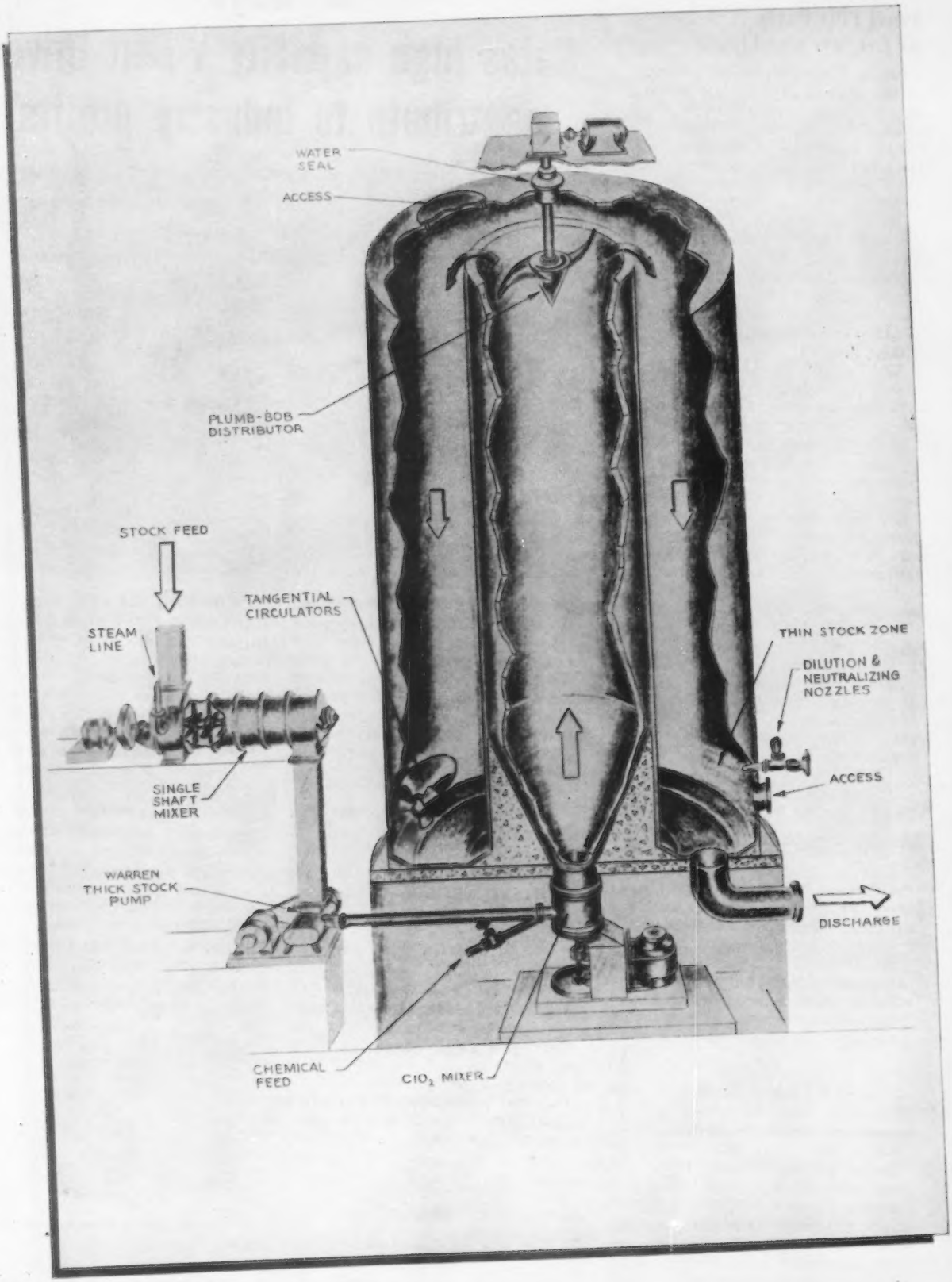
same hp capacity in smaller "package"

The Gates Rubber Company, Denver, Colorado
Gates Rubber of Canada Ltd., Brantford, Ontario

Gates

The Mark of Specialized Research

GATES SUPER HC HIGH CAPACITY V-BELT DRIVES


WATER SEAL
ACCESS
PLUMB-BOB DISTRIBUTOR
STOCK FEED
TANGENTIAL CIRCULATORS
STEAM LINE
THIN STOCK ZONE
DILUTION & NEUTRALIZING NOZZLES
ACCESS
SINGLE SHAFT MIXER
WARREN THICK STOCK PUMP
DISCHARGE
CHEMICAL FEED
ClO_2 MIXER

NEW DORR-OLIVER TOWER DESIGN CUTS COSTS, IMPROVES ClO_2 BLEACHING

- *Low construction cost*
- *Minimum space requirements*
- *Reduced heat loss and power requirements*
- *Lower ClO_2 losses, puffs eliminated*
- *Retention time fully controlled, even during emptying*

High density chlorine dioxide bleaching of kraft and other pulps, with improved uniformity and reduced losses, is now possible with a new concentric tower design by Dorr-Oliver.

The design is not only simple and dependable, but also offers the advantage of lower first cost, minimum space requirements and reduced maintenance. Basic features are the concentric construction which combines an inner "upflow" tower with an outer "downflow" cylinder in one compact unit and the use of a specially designed ClO_2 mixer and distributor.

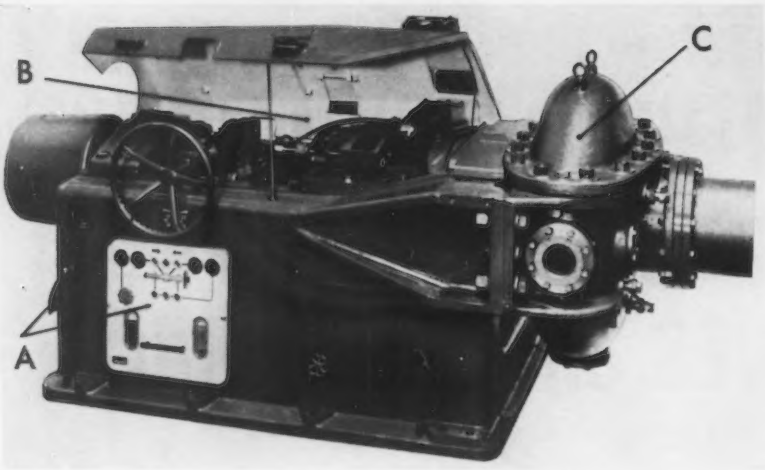
Operation consists of introducing the chlorine dioxide to the pulp by means of the mixer at the base of the tower, holding the mixture under hydrostatic pressure in the inner section until 90% of the ClO_2 is consumed, and overflowing into the outer downflow section for dilution, neutralization and final discharge. The unique "plumb-bob" distributor at the top of the tower spreads the pulp uniformly over the weir into the downflow section. Retention time can be varied with pulp and tonnage requirements. Standard tile-lined steel construction is used and erection can be either indoors or out.

Successful operation has already been demonstrated in kraft production. Equipment is available for capacities from 100 tons to 800 tons per day. For full information, write Dorr-Oliver Incorporated, Stamford, Connecticut.

DORR-OLIVER

WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT

NEW EQUIPMENT & SUPPLIES



Defibrator Usable for Semi-Chem, Asphalt Dispersion

The L-36 Defibrator, now being used principally for producing wood fiber for hardboard, insulating board, and roofing felt, conservatively rated at 800 tons of hardboard fiber per day, can also be used for semi-chemical pulping and asphalt dispersion processes, with capacity up to 150 tons per day.

The defibrator operates with a maximum steam pressure of 180 p.s.i. and is driven by a motor of 400-600 h.p. It has two 36 inch disks, one rotary and one stationary, with replaceable segments. Segment holders, housing and top cover are all stainless steel, and the top cover is easily removed for replacement of segments without breaking the piping line.

Grinding pressure is regulated hydraulically from a centralized control panel by means of an oil pressure system with safety controls. The L-36 is available with either reciprocating type valves or direct nozzle blow valves for discharging the processed fiber from the Defibrator. Manufactured by American Defibrator, Inc., Chrysler Building, New York 17, N. Y.

Bulk Materials Tractor Has Extra High Lift

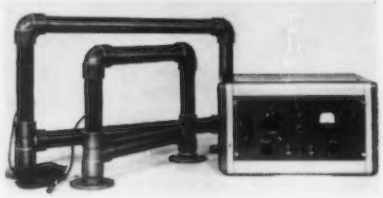
To meet bulk handling situations in which extra high dumping, such as into high bed road trucks, or large containers is required, Yale Materials Handling Division has developed a special high lift model of its industrial tractor shovel. The units provide a full seven feet, two inches of dumping clearance, an increase of 14 inches over Yale standard models.

High dumping clearance in the special Y-18 tractor shovel has been accomplished with no sacrifice to the unit's digging capacity, full-load, 45 degree bucket tip-back carry position and overall speed of operation. Capacity of the tractor shovel is 1600 pounds. The angle of dump with the higher bucket is 43 degrees. Necessary lengthening of the Y-18 to achieve the high dump clearance adds only 10 inches to the turning radius, permitting ample maneuverability to operate in and out of freight cars.

Longer bucket arms to increase the height provide a maximum reach of 42 inches achieved with the bucket at a height of 53 inches. The special tractor shovel units can be provided with a full range of buckets from 12 to 27 cubic feet capacity. Yale & Towne Mfg. Co., 11,000 Roosevelt Blvd., Philadelphia 15, Pa.

Electronic Detector of All Types of Unwanted Metal

An electronic metal detector which locates all types of ferrous and nonferrous metals and alloys is being marketed by Morehouse Machine Co., York, Pa. The unit, called the Meta-



bloc Metal Monitor, consists of a search coil and a control unit. The search coil is usually installed around a non-metallic conveyor belt or weigh feeder so that any metallic

RODNEY HUNT
SHAF-TITE® ROLLS
METAL • RUBBER • WOOD • PLASTIC
RODNEY HUNT MACHINE CO., 10 MAPLE ST., ORANGE, MASS.
Exclusive U. S. Agents for FILLED CALENDER ROLLS made by David Bentley, Ltd., Manchester, England

Leadership in Paper Making Chemicals

WHEN SHE'S A GREAT-GRANDMOTHER THIS BOOK WILL BE "LIKE NEW"

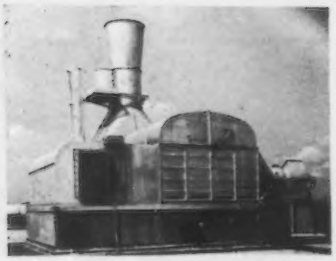
Books like "Sleeping Beauty" have been bringing a smile to children's faces for generations. But the casualty rate is high . . . continual reading soon takes its toll and the book must be replaced.

Now there is a way to manufacture book paper that will last as long as 300 years under the conditions of everyday use. This paper was developed by the well-known restorer of documents, W. J. Barrow, under a grant to the Virginia State Library by the Ford Foundation's Council on Library Resources.

Only an alkaline-sizing agent could be used, and Aquapel® sizing agent was the logical choice. Aquapel is more than a conventional paper size. It becomes an integral part of the paper. Since it is on the alkaline side, the paper is stronger and more durable.

Paper Makers Chemical Department
HERCULES POWDER COMPANY
INCORPORATED
900 Market Street, Wilmington, Delaware

PPGO-4



SF HEAT RECOVERY UNITS SAVE BTU'S and DOLLARS

SF Heat Recovery Units offer tremendous savings in many areas of a mill operation. Savings are so great in fact, that people in mills which have had these units installed have been rumored to call them "money machines."

One thing that the SF Heat Recovery Units do is to utilize heat from various drying processes which would otherwise be lost through the exhaust system. This, of course, means that your heat supply and power costs go down.

And, the recovered heat can be used to pre-heat make-up air for the dryer, for ventilation purposes or to pre-heat water if desired.

Building maintenance can be cut down, too. With the help of an SF Heat Recovery Unit, walls and roof can be kept dry all year round, so moisture damage and building rot can be things of the past.

Call or write today, and let one of SF's engineers show you how an SF "money machine" can cut down your operating costs and increase your profits.

★
AMERICAN SF PRODUCTS, INC.
420 Lexington Avenue, New York, N. Y.
SF Products Canada Ltd.,
940 Cote de Liesse Road, Montreal

object moving through its field will produce a signal. This signal can be used to trigger an alarm, stop the conveyor or, to mark, divert or reject the material containing the metal.

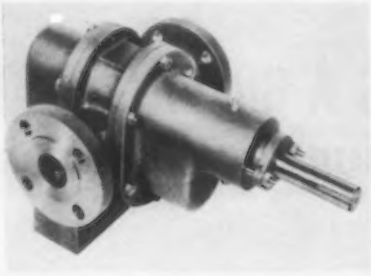
The entire system is designed and constructed to industrial standards to insure operational stability. The search coil is sealed in polyvinylchloride plastic pipe for protection against moisture, dust and weather. For additional details, write to Morehouse Machine Co., 1742 Sixth Ave., York, Pa.

Gear Pump Line Extended

Eco Engineering Co., No. 1 New York Ave., Newark, N. J., has announced their 900 Series Gearchem Pump with 1½ in. ports and flows to 27 g.p.m. (1000 SSU oils). This series, added to the ⅜ in. and ¾ in. port size Gearchems with capacities of 3 g.p.m. and 10 g.p.m. respectively, greatly enlarges the range of service applications of these pumps.

Two models are available; either with threaded ports or with integrally cast 150 lb. A.S.M.E. flanges, as illustrated.

Pump housings and shafts are 316 stainless steel and gears are either Hastelloy C, phenolic or polyamide (Nylon) resin. Bearings are

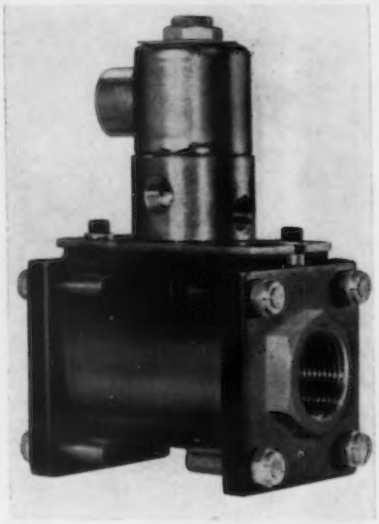


press-fit carbon sleeves and may be flushed via flush-ports provided in the bearing hubs. Replaceable wear plates of carbon or chemical-type ceramic are standard equipment.

An extra long stuffing box is provided for Teflon or other mechanical packing as required and is equipped with a lantern ring which may be sealed with a chemically inert sealant and lubricant or connected to pressure flush. Other features include: speeds, depending upon viscosities, up to 1200 r.p.m.; viscosities to 50,000 SSU at reduced speeds and capacities; discharge pressures to 150 p.s.i.; temperature ranges to 400° F. with metallic gears, to 150° F. with phenolic or polyamide gears.

Poppetless Valves Have Squeeze Action

Airmatic Valve, Inc., announces the Tube-O-Matic valve with unique squeeze action to control automati-



cally the flow of air, oil, and chemicals without the use of poppets or spools. There are no metal to metal contacts and no metal to rubber seals.

When the valve is open, supply pressure through the inlet port forces an elastic rubber sleeve against the tube, forcing the media to flow around the inlet plug and through the outlet port. To close the valve, pilot pressure is applied between the inside diameter of the tube and the outer periphery of the rubber sleeve. This collapses the sleeve over the rounded ends of the inlet and outlet end plugs, sealing off the supply pressure. The only action is the flexing of the sleeve.

Pressures up to 200 p.s.i. can be handled. Pipe sizes: ¼ to 12 inches. The valve is available either normally open or normally closed. Airmatic Valve, Inc., 7313 Associate Ave., Cleveland 9, Ohio.

Walkie Truck Transports Rolls in Horizontal Position

A roll handling walkie truck designed for transporting rolls of paper in the horizontal position assures the operator of a clear controlling view when positioning the load. Horizontal positioning also enables the roll to be directly fed to machines in many operations.

All the operator has to do to engage a roll in the vertical position is to insert a roll plug in the center of the roll. The walkie truck then moves forward and the roll plug

a wealth
of wet strength
with

SCRIPTITE* 40

A cationic urea-formaldehyde resin, Scriptite 40 imparts a high degree of wet strength to paper, with less resin add-on. In addition to raising tensile and wet bursting strength, Scriptite 40 also improves dry tensile strength, dry mullen, wet rub resistance, internal sizing, pick resistance, dry stiffness, dimensional stability, and folding resistance. For technical assistance, samples, and literature, write to Monsanto Chemical Company, Plastics Division, Room 779, Springfield 2, Massachusetts.

Monsanto®

MONSANTO DEVELOPER IN **PLASTICS**

The Monsanto line of paper resins also includes: **SCRIPTITE 50** *for unsurpassed printability and improved surface characteristics on boxboard.* **SCRIPTITE 33** *a melamine wet-strength resin.* **SCRIPTITE 52** *in combination with formaldehyde to give water resistance to folding boxboard and to jute liner.* **SCRIPTITE 54** *for outstanding water resistance and both wet and dry rub resistance.*

*SCRIPTITE: Reg. U. S. Pat. Off.

The DRAPER Felt
DRAPER BROTHERS COMPANY
CANTON, MASS.

spindle engages with the spring loaded lock. The cradle bumper tilts the roll slightly forward allowing the lower lip to slide under the roll. With the roll secured both top and bottom, the roll is then tilted backward to a horizontal position for transporting.

To release the roll in a vertical position, the roll is tilted upward. A hand release latch is tripped allowing the roll plug spindle to slide past the released arm of the lock. As the

roll plug spindle passes the arm, it trips the locking mechanism and resets the spring loaded lock to a "receive" position for handling the next roll.

Designated as Model E2CL Tilting Truck by its manufacturer, Lewis-Shepard Products, Inc., 125 Walnut Street, Watertown, Mass., the unit has a capacity of 2000 pounds. The cradle assembly accommodates rolls 30 to 38 inches in diameter and 66 inches long. The truck's overall length (with cradle horizontal) is 85½ inches; its wheel base is 44 inches; overall width is 32 inches.

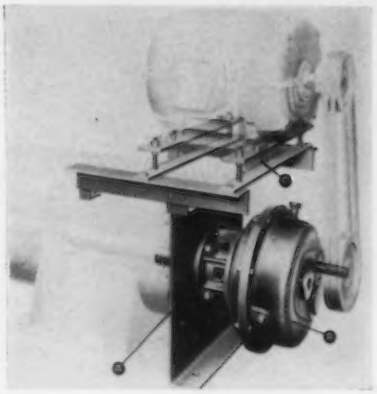
D.C. Motors, Generators, Have Silicone Insulation

Totally enclosed d-c motors and generators designed for both constant speed drives and drives involving fast, wide speed changes and reversals, automatic control, or close regulation are available from the Westinghouse Electric Corp. The line includes totally enclosed fan-cooled and totally-enclosed nonventilated machines in both industrial and explosion-proof construction. The motors are rated from ½ to 60 h.p. at 300 to 3500 r.p.m. The generators are rated from ¾ to 40 k.w. at 850 to 3450 r.p.m.

Two departures from conventional design are: (1) the use of a high-temperature silicone insulation system for machines rated and built for continuous operation with a temperature rise of only 75 degrees C (NEMA's Class B standard); and (2) application of a new high-capacity system of controlled ventilation in which blowers and heat exchanger are mounted at the shaft end.

Principal advantages are faster response, stability and increased insulation life. Armature inertia is said to have been decreased 75 per cent. Field time constant (the electrical inertia important to generator response) has been decreased by 35 per cent. Commutating ability is increased by 35 per cent.

The silicone insulation system is an integration of high-density components. Since the space thus gained is used for copper, heating within the machine is lessened and the total heat dissipation problem is moderated. To eliminate any possibility that silicone vapors might be driven off during operation at high temperatures, armatures and field coils receive a long bake at 200 degrees C to fully cure the silicone. Westinghouse Electric Corp., P.O. Box 2099, Pittsburgh, 30, Pa.



Drives Connect Directly to End of Screw Conveyor

A direct applied screw conveyor drive, Type B, consisting of a standard double reduction shaft-mounted speed reducer, is available from Link-Belt. The drive is equipped with a removable steel shaft and a cast iron adapter, which houses the shaft seals, for mounting directly to trough-end of screw conveyors.

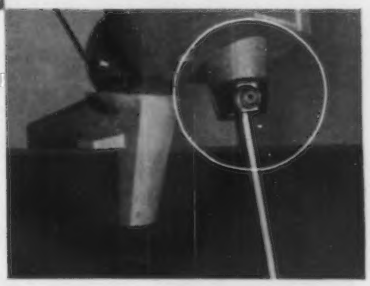
Six sizes are available from stock in double reduction with ratios of 15:1, 20:1, and 24:1 for motors up to 30 h.p. They can be applied on screw conveyor sizes from 6-in. screw by 1½-in. shaft to 24-in. screw by 3-7/16 in. shaft.

The drives have adjustable motor bases with trough supports and jack screws. The adapter is bolted to the trough end with all mounting bolts visible and easily accessible. Splash-type lubrication with built-in baffle system is provided. Three types of seals are available, lip, felt, or waste packing, depending upon the type of material being conveyed and service conditions. The drives can be mounted on conveyors inclined up to 20 degrees or can be modified for greater inclines. Link-Belt Co., Dept PR, Prudential Plaza, Chicago 1, Ill.

SHOCK OVERLOADS can't damage the mixer drive. In gear-drive models, GripSpring assembly between gear and drive shaft lets gear slip if overloaded more than 50%. It's a safety feature you never could get before in a portable mixer.

NEW MIXER

Get set to topple some traditions in fluid-mixing ease and economy



SAVE COST of a corrosion-resistant alloy with this shaft chuck. It's way up out of the tank—always above liquid level. It's simple, quick-acting. Tighten one screw, and shaft is locked—can't come loose unless you want it to.

You won't have to lubricate it for five years.

Overloads can't hurt the gear drive.

It comes with a chemical plant motor as *standard*, at no extra cost.

You don't need three hands to remove the shaft.

And it mixes fluids like no portable mixer you've ever seen. Delivers up to 45% more fluid flow in gear-drive models . . . higher impeller head in direct-drive models. Actually lets you handle many mixing jobs with a *smaller* mixer drawing *less power.*

That's just a sampling of the new LIGHTNIN Portable Mixer. It has been tested under every conceivable condition of use and load. It's ready—in sizes from ⅛ to 3 hp, gear drive or direct drive. And the price is right.

Your LIGHTNIN Mixer representative will be glad to show you why you can use it to mix fluids better—and at lower cost—than ever before. You'll find him listed in Thomas' Register and in the yellow pages of your telephone directory. Call him today. Or write us for descriptive Bulletin B-520.

NO MYSTERY about the right mixer angle for best mixing. Vertical and horizontal indexing makes it a snap to describe the right setting so everybody understands.

IN FIXED MOUNTINGS, TOO. Get the same all-new advantages in permanent-mounting LIGHTNIN Mixers for open and closed tanks. A complete line, sizes from ¼ to 3 hp. For details on these, send for Bulletin B-521.

Lightnin® Mixers

MIXCO fluid mixing specialists

MIXING EQUIPMENT Co., Inc., 172-k Mt. Read Blvd., Rochester 3, N.Y.

In Canada: Greey Mixing Equipment, Ltd., 100 Miranda Avenue, Toronto 19, Ont.

How Nicolet Solved Glassine Refining Problems

The production of glassine and greaseproof paper presents particular problems in all phases of stock preparation. Although not every one of these problems has been solved, 33 years of specialized experience by Nicolet Paper Corp., West De Pere, Wis., were concentrated in its recently-completed expansion program.

The overall project was the subject of a feature article in the issue of PAPER TRADE JOURNAL at which time we promised our readers a more detailed article on the Stock Preparation System.

Feeding the new 160-in. paper machine (No. 3) is a stock preparation system which represents what Nicolet considers the best equipment and techniques for producing glassine papers from the pulps it uses. This "three-phase" system is described below, in full detail, for the first time.

Design and layout work for the project was largely done in Nicolet's own engineering department, with certain technical assistance provided by equipment manufacturers. In terms of production, these new facilities should boost Nicolet from fourth to third place among the country's glassine producers.

Intensive "Three-Phase" System

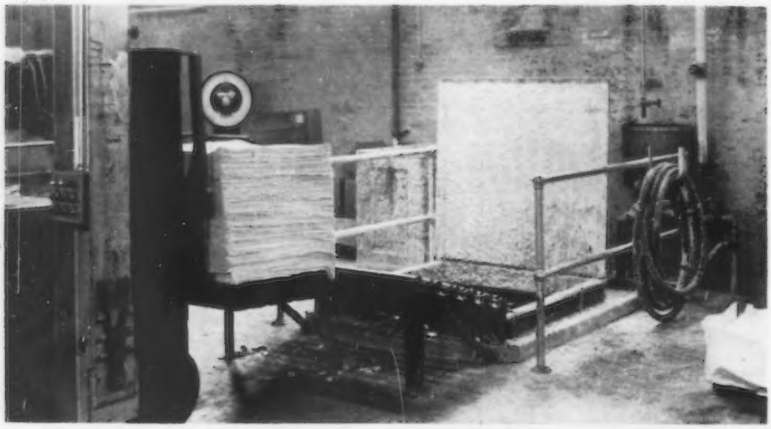
For the production of glassine and greaseproof papers, the preparation of the pulps is of crucial importance. In essence, a particularly high density system is required which will handle very hydrated stock at a high consistency. The goal — extensive fibrillation of the fibers — is met at Nicolet by a three-phase system of stock preparation: pulping, beating and refining.

Slushing Problems

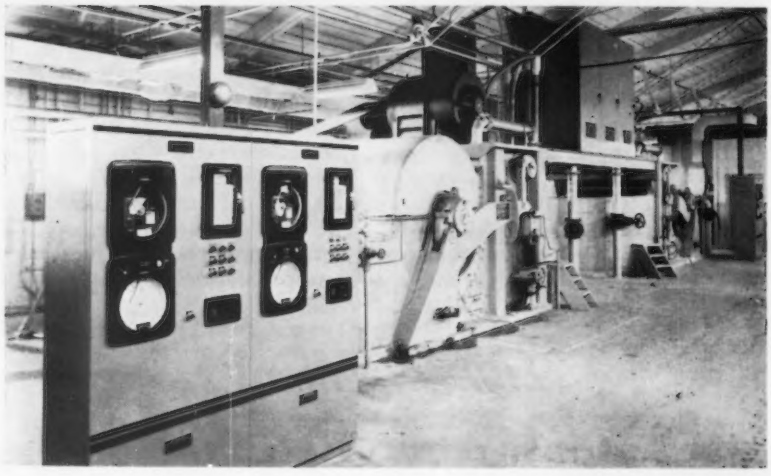
In the pulping phase of Nicolet's new stock preparation system, two problems inherent with the production of glassine had to be dealt with. The first of these is that the trend toward treating of glassines with special surface materials results in broke which is extremely difficult to break down; and the second is the need for complete disintegration of pulp into heavy consistency stock needed for beating.

At Nicolet, bleached and unbleached sulphite pulps as well as bleached and semi-bleached kraft pulps are used. These arrive by freight car in dry form (50 to 100 per cent "air dry"). Lift trucks bring them from storage to the pulpers.

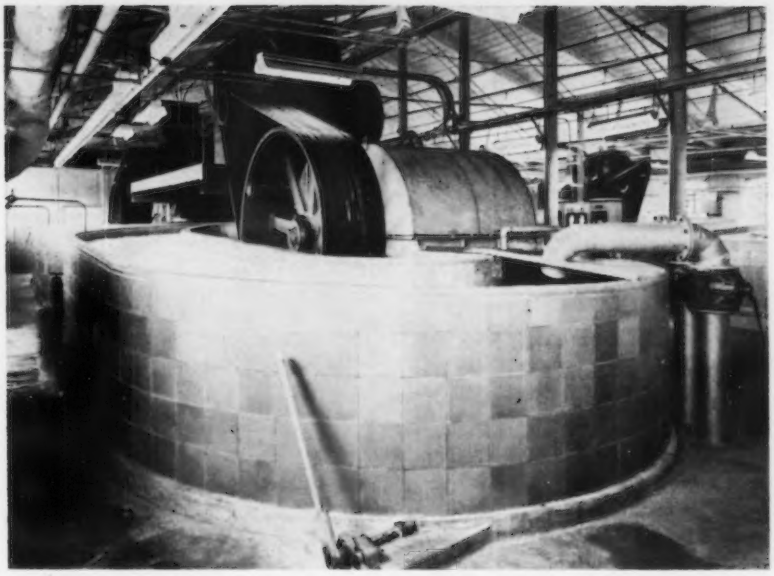
Two "Hi-Lo" Pulpers, manufactured by E. D. Jones Corp., Pittsfield, Mass., were chosen by Nicolet's personnel to meet the problems outlined above in the initial preparation of stock for the new, 160-in. "No. 3" paper machine. These were installed



TOP OF "HI-LO" PULPER, level with floor. Pulp from fork lift, left, is guided into pulper over short stretch of roller conveyor, center.



INSTRUMENTATION FOR TWO OF BEATERS in foreground (third is at far right rear). Aluminum cam which determines pressure and length of beating time can be clearly seen through top round window.



CLOSE-UP OF ONE OF BEATERS. Lever in foreground operates valve for "dropping" stock to beater chest.

so that their inlet openings are level with the operating floor.

Each of them has a 2,500-lb. at 7.5 per cent consistency (dry weight) capacity stainless stell tank and is equipped with two rotors: low-speed (driven by 100 h.p. motor) for initial disintegration and blending, and a high-speed (driven by 125 h.p. motor) for complete defibering through violent agitation.

With these two units, stock is slushed in two cycles. First, broke and chemical additives are agitated from 10 to 15 minutes by the low-speed rotor which "shoots it across," then pulp is added and the cover is closed for approximately 30 minutes of high-speed defiberization.

The most important result, according to plant personnel, is that stock can be pumped to the beaters at seven per cent consistency, which experience has shown to be ideal. In addition, there has been no trouble reported with broke "specks" on the No. 3 machine.

A large valve located in a 20-inch pipe beneath the pulpers allows stock to flow by gravity to a bronze-fitted pump, where the pipe narrows to 17 inches at the intake point. Then, the stock is pumped out through an 8-inch pipe to the beater room, about 120 feet away, still with no loss in consistency. All piping is of stainless steel. Both pulping and beating operations are located in the old building.

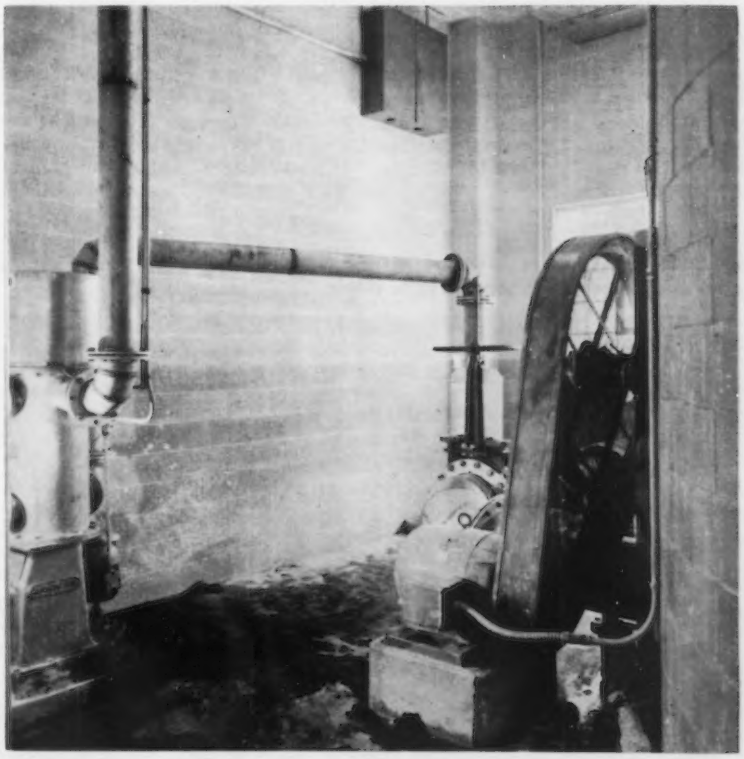
Lava Beating Tackle

The major problem in beating stock for glassine and greaseproof paper is to accomplish extensive fibrillation of fibers. Because of this, all beating at Nicolet is done with German lava, rather than metal, tackle. The lava combines the ultimate in hydration with the minimum of cutting of fibers, thus assuring the maintenance of as much strength as possible in the finished sheet. So far as is known, this mill is unique in the extent to which lava stone is employed throughout stock preparation processes.

Three E. D. Jones beaters are in use to serve the No. 3 machine. Tubs are of glazed tile and each is of approximately 2,500-lb. capacity with basalt lava rolls and triple basalt lava bedplates, covering an arc of 75° of roll circumference. Each is driven by a 300 h.p. motor and is automatically controlled for roll loading by Foxboro cam-type instrumentation. These cams are cut according to various paper specifications, and determine both pressure and length of beating time for desired freeness.

Actually, these metal cams, located in the beater roll loading control panels, determine beater cycles. Different pulps or pulp blends, as well as various degrees of hydration, dictate selection of cams from a stock of many shapes and sizes.

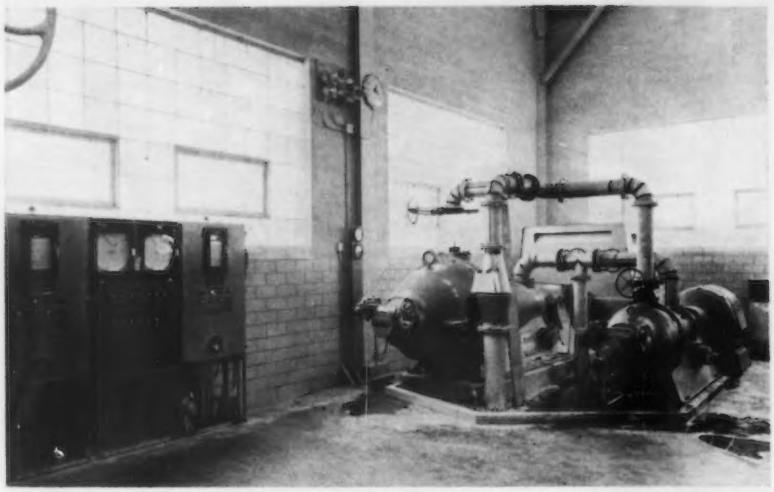
The beating cycle occupies an



MACHINE CHEST (right) in basement of new building. Motor, center, operates horizontal agitators. Consistency regulator, left, receives stock through horizontal pipe, and discharges it through vertical pipe to refiners above.

average of 75 to 90 minutes, but occasionally may be extended to two hours if the quality and type of pulp so dictate. Stock is tested by measurement of the Schopper-Riegler freeness of each beater about five minutes before end of cycle. When beating for glassine quality, a single beater may treat up to 16 tons in 24 hours.

Stock drops by gravity from the beaters, through hand-operated valves, into a common beater chest. Dilution "white" water is used to "flush-down," reducing final consistency to a 3.5-4 per cent range. The glazed tile beater chest has a capacity of about two beaters (5,000 lbs. dry weight) and Jones horizontal agitators keep the material in suspension.



REFINING EQUIPMENT AND CONTROLS on machine room floor in new building. Large unit, center, is "Majestic" jordan, and "Fibremaster" is at right.

Refining Stage

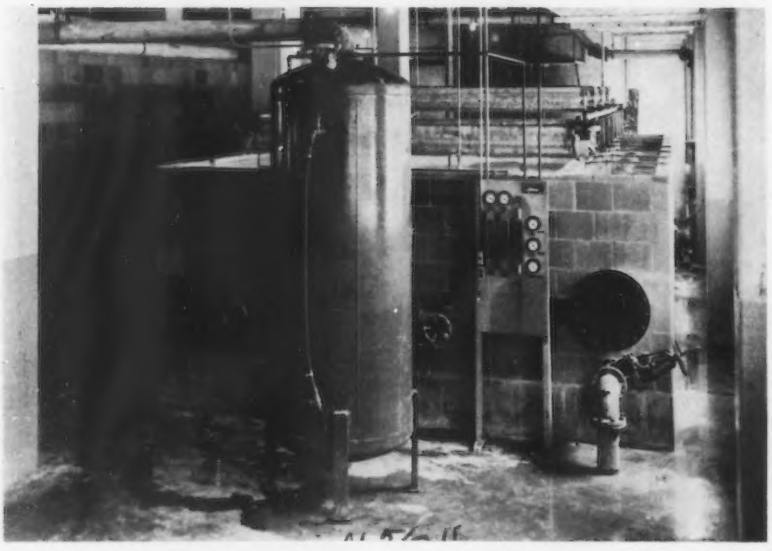
At this point the scene of operations switches from the old to the new building. From the beater dump chest, in the old building, the stock is pumped through an eight-inch stainless steel pipeline for a distance of 600 feet to the tile, circular machine chest in the new building. This chest has the same capacity as the beater chest and is also equipped with horizontal agitators.

Then, from the machine chest, stock is pumped through consistency regulars of the mechanical type, and take the full flow of stock with capacity to handle a wide range. From the regulator, stock is pumped vertically for 19 feet to the main, machine floor of the new building to refining equipment.

Two refining units are employed by Nicolet prior to pumping of stock to machine head box. One of these is an E. D. Jones "Fibremaster," with a connected horsepower of 150, equipped with a lava plug and shell. This refiner is used in the production of "slower" or low production grades.

The other refiner is an E. D. Jones "Majestic" jordan, drawing upon a connected horsepower of 400, and equipped with bronze bars. It is brought into use in the production of high freeness grades. These two units are piped so they can be used singly or in parallel, depending upon ultimate paper grade. In addition, their installation is such that they can be piped, with no extra trouble, for use in series.

FLOTATION SAVE-ALL in basement of new building. "Aqua-Air Spray" aeration system is enclosed within aeration tank, center.



New Save-All Installed

Wisconsin state regulations against water pollution are, as might be expected, very stringent. To comply with these regulations, Nicolet originally installed a Sveen-Pedersen flotation save-all. This was so effective that a second unit was added. Now, with the mill expansion, a third Sveen-Pedersen system has been installed, in the basement of the new building. It is of the latest design, with a 700 g.p.m. capacity and a tile tank.

The Sveen-Pedersen flotation system at Nicolet incorporates one of the first installations of the new "Acqua-Air Spray" aeration systems in the country. This automatic device forces air into solution under pressure in the aeration tank, thus eliminating large undissolved air bubbles and insuring complete solution of the metered compressed air. In addition, it is now possible to operate the aeration retention tank at pressures 20 to 25 per cent lower than in the past.

Nicolet reports that its past experience with Sveen-Pedersen Save-Alls has proved them extremely successful in handling the extensively fibrillated fibers which are a necessity in the production of glassine and greaseproof paper.

It has also been seen that throughout the entire mill, use has been made of glazed tile chests, stainless steel piping and bronze-fitted pumps. So successful have been these slime-preventive measures, mill technicians report, that the need for slimicides has been completely eliminated.

Kraft Pulping With Polysulphides

Results in "Unprecedented" Yields

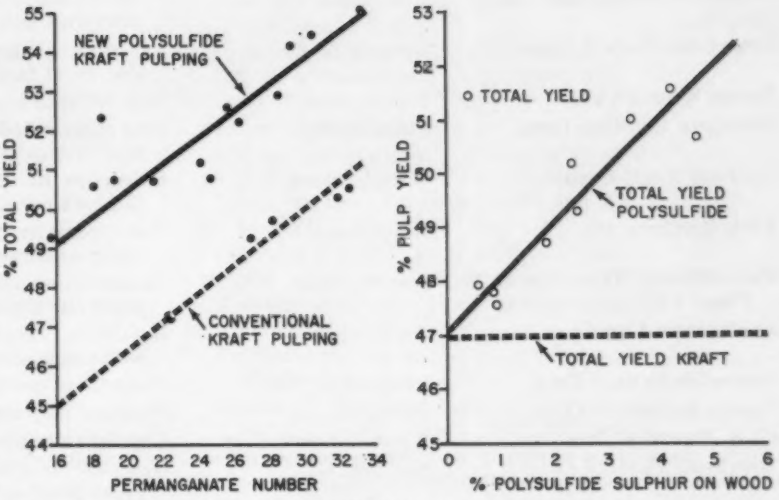
Increases in kraft pulp yields in excess of 8.5 per cent can be gained by substituting sodium or potassium polysulphide for sodium monosulphide in the white cooking liquor. Moreover, says the originator of the new process, the greater the percentage of the alkali polysulphites present, the greater will be the pulp yield. Irwin W. Scopp, the originator, calls such yields "unprecedented." Dr. Scopp points out that in the conventional kraft process, yields are in the range of 46 to 50 per cent with the pulps having permanganate values between 18 and 34 respectively.

Depending upon the amount of delignification obtained, Dr. Scoop said, the new process makes possible yield increases up to 10 per cent, sometimes as high as 15 per cent, over conventional kraft, with the pulps having similar permanganate numbers.

In general, the yield increases in the case of severe cooking, such as may be to produce bleachable grades, is notably higher than before; and in less severe cooking conditions, the improvement in yield generally becomes even more pronounced.

In the Polysulphide Process, as Dr Scopp refers to his modified kraft method, digestion is carried out at a 4:1 liquor to wood ratio, 170°C operating temperature, under an autogenous pressure ranging between 100-140 p.s.i. Time to raise operating temperature to normal may consume ½ to 5 hours, with 1¾ hours considered normal. Cooking time may be held for ½ to 3 hours, preferably for 1-1½ hours. It may be desired, for example, to obtain a given yield in shorter time by operating at higher temperatures; or the process may be operated commercially at lower temperatures and shorter times to give a yield equal to that now produced in conventional kraft operations.

In carrying out the cooking operation, the amount of active alkali, expressed as in the white liquor Na_2O, may vary between 15 to 35 per cent based on the charge of wood. Good results are obtained using about 20 to 25 per cent. A sulphidity of 19 per cent is considered preferable when using sulphurated potash. Sulphidity may be established by introducing into the white liquor, containing Na_2S, such alkali polysulphides as Na_2S_2, Na_2S_3, Na_2S_4, Na_2S_5, or possibly higher polymers, or mixtures of these polymers. The sodium system has some advantages from the standpoint of costs. However, assuming equal costs, operations employing sulphurated potash or sulphide polymers of potassium are preferred. It was found that the potassium system gave the higher rate of yield when equal weights of sodium and potassium were compared.



Comparison of yields between polysulphide kraft and conventional (monosulphide) kraft pulping.

During the black liquor recovery operations, depleted alkali can be supplanted with alkali sulphates, such as Na_2SO_4 and/or K_2SO_4. While potassium sulphate requires a higher decomposition temperature than its sodium equivalent does during the subsequent burning of strong black liquor, it is noted that under reducing conditions a temperature of about 1000°C. is suitable. Furthermore, because K_2SO_4 has a higher decomposition temperature, less K_2O may be lost during the smelting operations.

As noted above, sulphide polymers may be prepared by treating a portion or all of the white and green liquors with elemental sulphur. Sulphur also may be mixed or slurried with the white liquors prior to, or during, the reaction with the wood chips. Preferably, a portion or all of the cooled and dissolved smelt may be treated with sulphur for formation of the alkali polysulphides.

Polysulphide pulps compare favorably with the conventional kraft pulps. They have, said Dr. Scopp, better bonding properties, higher bursting strength, higher tensile strength, but slightly lower tensile strength. Bleached polysulphide pulps have slightly lower opacities and the unbleached polysulphide pulps have slightly lower brightness. Furthermore, he said, pulps prepared according to the Polysulphide Process require a less severe bleach and the use of less severe bleaching chemicals, such as calcium hypochlorite.

A further benefit, claims Dr. Scopp, is that the conventional equipment used for kraft pulping, washing and screening, liquor evaporation and combustion, and bleaching of the pulps should serve equally well for the polysulphide process.

The Polysulphide Process is detailed more fully in U.S. Patent #2,944,928, issued to Dr. Scopp. Dr. Scopp heads up I. W. Scopp (research) Associates, of 4 Stuyvesant Oval, New York 9, N. Y.

Industry Major Expansion Projects

(Completion after Oct. 1, 1960)

Company name	Location	Nature of Program	Est. Completion Date
Anglo-Southern Paper Co.	Texarkana, Tex.	*Proposed* $60 million pulp and newsprint mill.	
Brunswick Pulp & Paper Co.	Brunswick, Ga.	$35 million expansion doubling present size. First facilities for making paper.	
Byron Weston Co.	Dalton, Mass.	New 107-inch paper machine.	Fall 1960
Bowaters Carolina Corp.	Catawba, S.C.	New paper mill for production of 75,000 tons of printing paper per year.	
Cascade Kraft Corp.	Wallula, Wash.	Expansion of kraft paper capacity to 375 tons per day.	Late 1961
Case Brothers, Inc.	Brattleboro, Vt.	New specialty paper and board mill under construction.	1961
Consolidated Water Power & Paper Co.	Stevens Point, Wis.	Expansion of pulping facilities and new paper machine for coated papers.	Jan. 1962
Continental Can Co.	Augusta, Ga.	$40 million bleached kraft and cold soda pulp and board mills 350 T/D.	Fall 1960
Crown Zellerbach Corp.	Kremmling, Colo.	*Prospective* newsprint mill.	
Crown Zellerbach Corp.	De Ridder, La.	*Proposed* pulp and paper mill.	
C. H. Dexter & Sons, Inc.	Windsor Locks, Conn.	Complete new paper machine.	
Deerfield Glassine Co.	Augusta, Ga.	New paper mill for production of glassine, greaseproof and lightweight specialties.	April 1961
Dixie Land & Timber Co.	Phenix City, Ala.	$30 million pulp and paper mill for production of kraft, paper and linerboard. About 300 T/D.	Early 1962
Eastman Kodak Co.	Rochester, N.Y.	New 150-inch trim machine for photographic papers.	
Fibreboard Paper Products Corp.	Eureka, Calif.	*Proposed* $40 million kraft pulp and mill. Joint venture with Simpson Timber Co.	
Fibreboard Paper Products Corp.	San Joaquin, Calif.	New 200 T/D kraft pulp and paperboard mill. 176-inch fourdrinier.	Fall 1960
Florida Gulf Fibre Co.	Port St. Joe, Fla.	$13.5 million mill to make semi-chemical corrugating medium.	Delayed
Grays Harbor Paper Co.	Hoquiam, Wash.	Adding second machine to bring capacity to 70,000 tons per year of fine papers. $10 million project.	Late 1961
Georgia-Pacific	Samoa, Calif.	*Proposed* new kraft pulp and paper mill.	
Gulf States Paper Co.	Demopolis, Ala.	New paper machine.	1962
Garden State Paper Co. (Subsidiary of Newark Evening News)	Garfield, N.J.	*Proposed* newsprint mill utilizing chiefly deinked waste papers.	
International Paper Co.	Ticonderoga, N.Y.	New bond paper machine.	Fall 1960
Keyes Fibre Co.	Sacramento, Calif.	New molded pulp plant.	
Keyes Fibre Co.	Shawmut and Waterville, Me.	Increased groundwood pulp production at Shawmut. New molding machines at Waterville.	Early 1961
Kimberly-Clark Corp.	Niagara, Wis.	Includes new 170-inch machine for coated papers. Production capacity 50,000 tons per year.	Jan. 1962
Kimberly-Clark Corp.	Fullerton, Calif.	New creped wadding machine.	
Lumberton Pulp Co.	Lumberton, Miss.	Unbleached kraft market pulp mill. 100 T/D.	Fall 1960
Longview Fibre Co.	Longview, Wash.	New 184-inch paper machine to make toweling and lightweight kraft papers. 125-150 T/D.	Spring 1961
MacMillan, Bloedel and Powell River Co.	Arizona	*Proposed* newsprint mill. 60,000 tons per year.	

Company name	Location	Nature of Program	Est. Completion Date
Menasha Wooden Ware Corp.	North Bend, Ore.	$5 million NSSC pulp and paper mill. Corrugating medium and semi-chemical pulp in rolls. 125 T/D. Fourdrinier 162 inch trim.	July 1961
Moraine Paper Co.	West Carrollton, Ohio	New 168-inch machine for bond and offset grades, new deinking plant.	Late 1961
Manchester Board & Paper Co. Div. of Federal Paper Board Co.	Richmond, Va.	$12 million expansion includes new cold soda pulp mill, new paperboard machine of 60,000 tons per year capacity, and new box plant.	Late 1961
Nekoosa-Edwards Paper Co.	Nekoosa, Wis.	New 172-inch trim fine paper machine to make 170 T/D.	Fall 1960
Noralyn Paper Mills, Inc.	West Baton Rouge, La.	*Proposed* $40 million project includes 400 T/D newsprint mill using hardwoods. 276-inch machine.	
Napex, Inc.	Colorado	*Proposed* nitric acid pulp mill.	
Oxford Paper Co.	Rumford, Me.	$15 million program includes new 175 T/D bleached softwood kraft pulp mill and increases hardwood kraft pulp by 100 T/D.	1961
Potlatch Forest Industries	Rohwer, Ark.	*Proposed* 300 T/D kraft pulp and board mill.	Early 1962
Palmetto Pulp & Paper Corp.	Orangeburg, S.C.	*Proposed* insulation board mill utilizing hardwood wastes.	
Romar Tissue Co.	Wheelwright, Mass.	*Tentative* high speed tissue machine. 96-inch trim.	
Rome Kraft Co.	Rome, Ga.	Adding 500 T/D production to kraft pulp and containerboard output. 254-inch machine.	
St. Mary's Kraft Corp. (Gilman Paper Co.)	St. Marys, Ga.	Expansion includes new 236-inch machine to make unbleached kraft papers.	
Southwest Forest Industries	Snowflake, Ariz.	$32 million mill to make kraft linerboard and newsprint. 150-inch trim linerboard machine. 240-inch trim newsprint machine. 65,000 tons of kraft and 75,000 tons of newsprint per year.	Late 1961
Southern Land Timber and Pulp Co.	Cedar Springs, Ga.	$42 million pulp and paper mill. 700 T/D of kraft linerboard.	1962
Scott Paper Co.	Mobile, Ala.	$20 million pulp mill expansion. New paper machine to make 200 T/D white converting and printing papers.	
St. Regis Paper Co.	Tacoma, Wash.	$30 million. Increase of 350 T/D in kraft pulp, paper and board. New 236-inch fourdrinier.	Late 1960
Simpson-Lee Paper Co.	Ripon, Calif.	$7 million paper mill for production of fine paper. 50 T/D. 120-inch fourdrinier.	Late 1961
Southwest Wood Pulp Co.	Pasadena, Calif.	*Proposed* groundwood market pulp mill. 50 T/D.	
Tennessee River Pulp & Paper Co.	Counce, Tenn.	$30 million new 500 T/D kraft pulp and linerboard mill.	Jan. 1961
U. S. Gypsum Co.	Jacksonville, Fla.	New mill. Nine cylinder machine, trim 156 inches. 150 T/D.	Mar. 1961
Waldorf Paper Products Co. of Montana	Missoula, Mont.	Adding liner board machine to existing market pulp mill.	Late 1961
West Virginia Pulp & Paper	Luke, Md.	$50 million expansion program includes two large printing paper machines, one to produce machine coated papers.	Fall 1960 1st machine
Western Kraft Co.	Albany, Ore.	Expansion from 90,000 to 135,000 tons of linerboard per year. New paper machine.	Early 1962
Wausau Paper Mills Co.	Brokaw, Wis.	Expansion includes enlarged machine room, doubling size of finishing and shipping facilities, modernization of sulphite pulp mill and new 124-inch fourdrinier with 100 T/D capacity of fine papers.	Early 1961
Weyerhaeuser Co.	Longview, Wash.	New 120-inch specialty paperboard machine.	Dec. 1961
Weston Paper & Mfg. Co.	Terre Haute, Ind.	New NSSC pulp mill using hardwoods. 150 T/D.	1961

Land Disposal: A Proven Approach To Stream Improvement at Weston

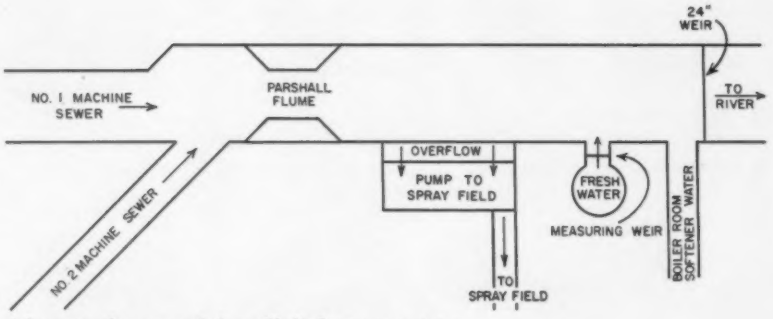
With $22,000, 2 miles of pipe, 6 sprinklers, and 52 acres, this is how an Ohio mill disposes of 1 million gallons of effluent a day . . . simply, economically.

Ernest F. Barker,
European Editor
Paper Trade Journal

In a procedure which is best described as a land irrigation method, the Auglaize Division of the Western Paper and Manufacturing Co., of St. Mary's, Ohio, sprays its effluent onto an open field adjacent to the mill. This procedure of effluent disposal has been in use at Weston on a commercial scale for three years and the results are considered quite satisfactory. The method is reported to be simple and economical.

Millions of dollars and countless man-hours have been invested by the pulp and paper industry in recent years in an effort to control and reduce stream pollution. As a logical consequence, an ever-increasing number of reports have been added to the industry's literature about all phases of stream pollution abatement, most of them concerned with such methods as effluent sedimentation and chemical coagulation. For this reason, a report about a relatively simple and economical method of disposing mill wastes that differs from such procedures can be expected to arouse a considerable interest in the industry. Weston is among the first industrial organizations to use this abatement method.

To briefly describe the method, the mill's effluent is pumped to a large, open field located adjacent to the mill property through one large pipe in its original, unfiltered and unsettled state. The waste material is then directed through a series of tributary pipes located in the field and sprayed on to the land by a battery of spraying devices of the type used in agricultural land irrigation practices. These spraying devices are equipped with nozzles which discharge a fine mist over a radius of nearly 100 feet of land. In this way, the effluent is absorbed by the soil in a manner quite similar to the way agricultural irrigation is practiced almost everywhere.



Schematic diagram of the mill ditch sewer system.

The company believes that this method of disposal is quite practical (and rather economical compared with other waste disposal methods in the industry) for its particular type of mill effluent, which contains a normal amount of fiber but relatively small quantities of filler. However, there is evidence that this method can also be used by mills whose effluents contain relatively larger amounts of filler.

Waste Paper User

The Auglaize Division of the Weston Paper and Manufacturing Co. is located at St. Mary's, Ohio, about 75 miles north of Dayton. The mill operates two six-cylinder machines, trimming 82 and 90 inches respectively. Production averages about 110 tons per day, consisting of test liner board, destined for conversion in the company's own box plants and also for general market sale. The mill has about 140 employees.

The company owns a 52-acre field adjacent to the mill property. This field was acquired for $30,000 in early 1957, the same year when the spraying operations were first started. The mill is located quite close to the St. Mary's River and like other mills its effluent disposal situation became quite critical some years ago because the river flow is periodically very low at this point. At the mill discharge point, stream flow is so low in summer and early fall that the river was unable to assimilate the total mill waste received. That was the situation before the spray waste disposal method was initiated in mid-1957.

The Auglaize Division of Weston uses mostly secondary stock for the manufacture of its liner board grades, consisting primarily of new

One of the last assignments before Mr. Barker left for Europe last spring, was to visit several mills throughout the country.

H. C. Koch, technical director at Weston, stands at the mill basement's sewer ditch and pump used for spraying system.

Mill ditch sewer closeup at point where part of effluent is diverted to pump sump through screen shown here.

and old corrugated material. Small percentages of unbleached and bleached kraft, unbleached sulphite, white shavings and newsprint are also part of the furnish.

J. K. Vogel is vice-president in charge of the mill and the division. Harold C. Koch is technical director. Eric A. Rinell, plant engineer, worked closely with Mr. Koch in the installation of this system. Joe J. Lugar is assistant technical director.

Why Spray?

The decision to try out the land spray system of effluent disposal was reached in 1956 after a consultant, Prof. D. E. Bloodgood of Purdue University, retained by the mill, pointed out that this method had been used for a number of years by various U.S. canneries and dairies, including the Campbell Soup Co. The idea to use the spray disposal method was, however, relatively new for the paper industry and it is believed that the Weston mill is one of the first to use it in this industry.

Consideration has, of course, also been given to the more conventional methods. Sedimentation treatment was weighed, for example, but indications were that this method would not be adequate and the difficulties connected with sludge disposal were considered as formidable as they have been found by other mills which practice sedimentation treatment. Chemical coagulation could be expected to result in greater purification but the sludge problem would also exist in this case. Moreover, the allied high chemical costs had also to be studied. In the face of such standard considerations, the spray disposal method was investigated and finally chosen on an experimental basis, with consent of the State of Ohio Stream Pollution Control Board.

The spray disposal method was first placed into operation in July of 1957. Only a small portion of the total mill effluent was at first handled in this manner and as time progressed, and as more experience was gained with the new system, increasingly larger amounts were removed from the discharge to the stream and diverted into the new installation. Weston still does not spray all of the mill's effluent onto the field, but it aims to do so. In spite of the fact that not all of the mill's effluent is treated, the following pollution reduction has been achieved: Since the year 1955-56 (which is the last period of total discharge into the stream) BOD has been reduced by 53.1 per cent (1958-1959 period), total suspended solids have been reduced by 50.4 per cent and volatile suspended solids have been reduced by 47.8 per cent.

Work continues to eliminate as many fresh water sources in the mill system as possible. This must be accomplished before the mill's entire effluent can be sprayed onto the field. Field absorption capacity is a factor that must be examined. It can be reduced by excessive effluent volume which could be the case with excessive fresh water dilution. In-plant movements in reducing the use of fresh water are presently expected to make it possible to continue to increase the volume handled by the spraying operation. Whether the 52-acre field will eventually be able to handle the mill's entire effluent is not

CHARACTERISTICS OF EFFLUENT AT PARSHALL FLUME

Average Data From Nov. 1958 through Oct. 1959

Flow	784 g.p.m.
Flow	1,128,960 g.p.d.
Total suspended solids	380 p.p.m.
Total suspended solids	3.17 #/M Gal.
Total suspended solids	3579 #/24 Hrs.
Fixed suspended solids	78 p.p.m.
Fixed suspended solids	0.65 #/M Gal.
Fixed suspended solids	734 #/24 Hrs.
Volatile solids	302 p.p.m.
Volatile solids	2.52 #/M Gal.
Volatile solids	2845 #/24 Hrs.
Temperature	100° F.
pH	7.8
BOD	373 p.p.m.
BOD	3.11 #/M Gal.
BOD	3510 #/24 Hrs.

Close-up of sprinkler head which covers a one-acre area.

The Parshall flume, measuring effluent to the river, is located near to the point of spray field volume separation.

yet definite, although there is optimism. The mill currently does not plan to acquire more land.

White Water System

Here is a brief run-down of the mill's white water system. All excess white water coming from the two paper machines is collected in a main sump. The white water contains practically no filler. The mill's water supply comes from deep wells and water hardness is 24 grains.

The machine wet-end pits are used as reservoirs from which the white water is recirculated to various parts of the mill. Major points of white water utilization include the pulper-beaters and all stock dilution is accomplished with white water, including the stock treatment department and machine felt washings.

The top liner system is still open and fresh water is still furnished to the beaters which contain the top liner stock. This is considered necessary because of frequent grade and color changes of top liners and the obvious need to keep this system separated from the filler stock system.

The mill is equipped with two 500 g.p.m. Bird Save-alls, one on each of the machines, which receive white water from their respective machine pits. The filtered water from these is stored in two 20 x 5 x 8 foot white water storage chests for use on machine felt showers and in stock consistency regulators. The recovered fibers are returned to the respective filler stock systems. Unfiltered water from the machine pits is pumped to the pulper-beaters and other stock dilution points not requiring a lower solids water. Excess water from the filtered water storage chests and the machine pits goes to the mill basement sewer.

The general mill sewer is equipped with an adjacent 2,200 gallon capacity pump sump which is connected by a rectangular opening equipped with a sliding steel gate. This steel gate is covered with a screen made of half-inch hardware cloth. The effluent diverted from the mill sewer ditch into the pump sump is then pumped to the spraying field with an Allis Chalmers centrifugal 500 g.p.m. capacity pump.

The Spraying Field

The 52-acre spraying field is separated from the actual mill property by the old Miami-Erie Canal. The field includes an old cemetery, a wooded area and a gravel pit. The top soil is brown silt loam and there is some gravel on the surface.

Many questions had to be answered in evaluating this method's applicability to paper mill effluents; not the least of which was the question whether crops and the soil would not eventually become so covered with fiber as to make continued spraying impossible. Since this project was initiated it has now been found that only negligible amounts of fiber have adhered to the leaves of the plants growing in the field.

At first it was predicted that the effluent sprayed onto the field would act as an irrigant and that the resulting irrigation of the crops would be a financial advantage which would help offset the cost of the spraying operation. This did not, however, work out. Harvesting is difficult because the network of flexible pipe which is part of the spraying system, lies on the ground throughout the entire field, which means that the crop (whatever its nature) cannot be effectively harvested. At present the field is in alfalfa. Weston is able to mow the crops by closely scheduling the operation, but cannot "hay out." The usual procedure of mowing, raking into wind rows, seasoning, and baling allows no water to be applied for periods of close to one week under ideal weather conditions. Stopping or even limiting the spraying operations during the mid-summer season when the stream demands maximum abatement activity cannot be considered. A combine-type of pick-up has been considered but preliminary investigation has shown that there is not

sufficient space to get into the field with such equipment. The alfalfa is now cut every three weeks and the hay then subsequently mulches away. A luxurious growth is the result. This has not actually harmed the field's absorption capacity. Rather, it has actually been beneficial.

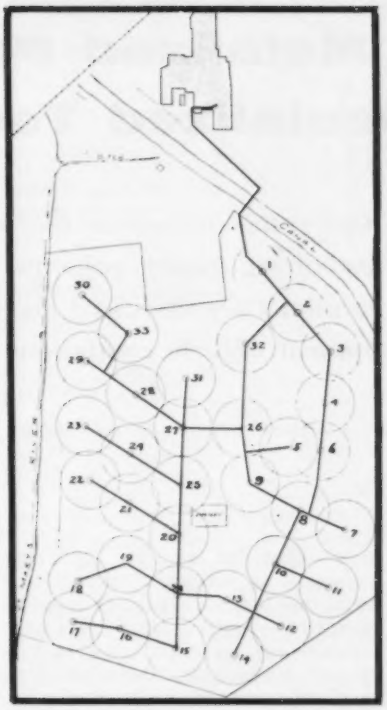
Two Miles of Pipe

From the sump pump adjacent to the mill sewer ditch, that part of the effluent to be sprayed, is pumped into the field. A 650-foot length of six-inch galvanized pipe carries the effluent into the field, where it is distributed to the sprayers by a system of five-inch aluminum pipe, totalling 10,000 feet. The galvanized pipe reaches over the Miami-Erie canal, supported by a specially built 64-foot, single-span steel foot bridge. Beginning at the irrigation field, the galvanized pipe is reduced to five-inch aluminum tubing with galvanized steel couplers. Aluminum tubing was chosen because it is convenient to move and handle. Each aluminum tube section is 30-foot in length.

All the ends of the tributary aluminum pipes are equipped with shut-off valves and also rapid connection devices for connecting them quickly and easily to the sprayer or (sprinkler) units. The Rain Bird sprinklers by Rainy Sprinkler Sales and the Champion Corp. pipe, quick coupling type adapters, valves, and fittings were supplied by Lane Engineering Specialties Co. of Lafayette, Ind.

Each sprinkler covers a one-acre area. These sprinklers are much like the familiar garden hose sprinklers, equipped with three 13/16-inch nozzles, with half-inch and quarter-inch openings. The spraying is continuous. This is a day and night procedure, practiced on all mill-operating days. Winter season problems are reasonably negligible. Thanks to a system of drain valves placed throughout the entire network which makes it possible to drain those lines not in use. There has been little difficulty with freezing of the lines.

There are six sprinkler heads and two are operated at one time. All connected to the system, they make possible a "leap frog operation," which keeps the sprayers going at all times. There are 34-sprinkler head connections in the entire pipe system. The sprinkler heads are moved every three hours to two other locations. This is done at all hours which means that 17 changes are possible before any one field area is subjected to repeat spraying in one cycle. In other words, each location rests for 48 hours per 51-hour cycle.



Distribution system and spray areas for the 34 sprinkler head connections.

The sprinkler heads rotate in a complete circle, distributing the effluent spray over a 100 foot radius, with a minimum of 7/10 acre coverage. The drain valves installed for winter operation are located at strategic points, dictated by ground contour. Where low areas necessary for drainage are not available, the lines are raised. Where this is not possible a line is blocked entirely during winter months.

Pressure in the system at any one point is maintained close to 70 p.s.i. and each sprinkler delivers approximately 240 g.p.m.

Close technical control is exercised over this procedure. The spray is measured in terms of effluent per inch, much like rainfall-per-inch measurements. Maximum application is 1.04 inches per day per nozzle. In October 1959, the lowest application was 0.81 inch and the application ranged between this minimum and the maximum during that month. Effluent-fall measurements are carried out with a flat bottom can, equipper with vertical sides, placed under the spray stream so as to collect a representative sample. The resulting measurement is then adjusted for possible rain-fall.

The operation of the spraying field is administered by the mill's technical control laboratory. One man per shift is charged with changing nozzles. This is a part-time job and the technician's spare time is utilized with other laboratory work. An estimated three hours per eight hour shift are required to tend to the spray nozzles. The men are supplied with battery operated miner's lamp helmets because they must have their hands free to disconnect and move the 25 pound heavy nozzle heads. A nozzle change schedule is posted in the laboratory, worked out so as to minimize the distance the nozzles have to be carried.

Not Costly

Compared with other methods of stream pollution abatement, the spray method can be considered quite economical. The land investment, $30,000 in Weston's case, is unpredictable for other mills, depending of course entirely on prevailing real estate values. The cost of the pipe, valve, fitting and spraying system at Weston should, however, be comparable. Weston invested $27,000 to install the system, including labor, the above mentioned facilities in the field, plus the construction of the bridge over the canal. Of this, $5,000 represents labor cost which brings the equipment investment down to approximately $22,000. This investment was spread over a two year period with approximately $12,000 spent in 1957 and $10,000 in 1958.

Of further interest is the fact that Weston adds sodium nitrate to the river to reduce the formation of sulphides and the resulting odors. This addition is confined to the summer and early fall months, when the stream flow is low and the water temperature is high. The mill laboratory obtains river water samples for analysis at regular intervals. When the dissolved oxygen (DO) reaches zero, sodium nitrate is added to the mill sewer, at a point down-stream from the pump sump which carries that part of the effluent destined for spraying. Approximately 1,000 pounds of sodium nitrate is added per day at a cost of $35. The mill has done this for the last three years since the time when the mill began to operate the spraying field.

Although the practicability of the effluent spray system appears to be demonstrating itself under Weston's particular circumstances, the question of the method's applicability when a mill deals with high filler content effluents has not yet been resolved by practical experience. However, it is believed that the filler would be so well dispersed as to present little difficulty in field absorption.

High Quality Metalized Paper Demands Specialized Techniques

The semi-continuous thermal evaporation process for metalizing paper presents various problems. Possible solutions are discussed together with the need for development of true continuous metalizing equipment.

Fred B. Shaw
Research Director,
Flexible Packaging Division,
Continental Can Co., Inc., Mt. Vernon, Ohio

The vacuum coating of solids by condensing a metal vapor thereon is not a novel art insofar as the basic concepts are concerned. In fact, actual commercial applications of vacuum metalizing were made over 20 years ago, both in the United States and in England.

Initial commercial applications of vacuum metalizing were based on the cathode sputtering system. Such a procedure makes use of a high tension current in a low pressure gas. This creates a glow discharge and the positive gas ions formed bombard the cathode, knocking individual atoms out of the solid crystalline structure; thus forming a vapor which condenses on any surface exposed to it. It is noted that in this process, the use of high temperature is not necessary and the metal never passes through the liquid phase. Since this process does not require an exceptionally high vacuum, it was possible to practice this art prior to the availabiliy of the very efficient, high-speed, vacuum pumps that are an essential part of today's semi-continuous equipment and tomorrow's continuous vacuum metalizing installations, both of which are necessarily based on the thermal evaporation process.

Thermal Evaporation Speedy

In the thermal evaporation process, the metal is heated to a temperature at which its vapor pressure is sufficiently high for rapid evaporation. It is essential that this should be accomplished in a high vacuum in order to avoid too many collisions between the atoms forming the metal vapor and the residual gas molecules, since such impacts would adversely influence the quality of the deposited metal film. In the case of most metals, it is necessary to melt the metal that is to be vaporized in order to attain a sufficiently high vapor pressure for evaporation, but in the case of magnesium, chromium and rhodium, evaporation can actually be accomplished from the solid state.

Provided the necessary vacuum pumping equipment is available, the thermal evaporating process is much to be preferred over cathode sputtering for many reasons, the two principal factors being speed and versatility. As much more concentrated vapors can be set up by evaporation than can be accomplished by cathode sputtering, a given area can be coated to a selected depth many times more rapidly by the thermal process. With regard to versatility, the thermal evaporation process will allow the deposition of several metals that cannot be processed by cathode sputtering; the most important of these being aluminum, which is the preferred metal in the vast majority of industrial applications.

Batch Process

Until comparatively recently, all vacuum metalization was accomplished on a batch basis. In this method, the items to be coated are placed in suitable holders around the interior surface of a large vessel, concentric to the vapor sources which consists of one or more small tungsten coils. Predetermined amounts of aluminum wire are placed in the tungsten coils at the time the vessel is loaded with the items to be coated, the chamber is then closed and pumped down to a pressure of two to five microns, after which a current is passed through the tungsten coils to melt and evaporate the aluminum, which step takes place in a matter of a few seconds. The vessel is then returned to atmospheric pressure, opened, the metalized items removed, after which the tungsten coils may once more be charged and the same process repeated, with frequent replacement of the tungsten coils which rapidly become embrittled in this service.

The batch process is still the principally used method of vacuum metalizing today, and the this country is widely applied to the decoration of molded plastic automotive parts, reflectors, toys and costume jewelry, but obviously has no applicability to the metalizing of web materials.

Semi-Continuous Method

To accomplish the metalization of plastic films, papers or any other web material on a commercial basis, it was quite obvious that one needed more than to incorporate unwinding and rewinding facilities within a suitably large vacuum chamber, so arranged that the surface of the web could be continually passed before the vapor source; the real problems were to devise a heating element or crucible that could evaporate metal at a uniform rate for appreciable periods of time, and a means for keeping the crucible supplied with new metal at a rate equivalent to the rate of evaporation. The first commercially practical solution to this problem was worked out by P. Alexander and A. de Sani and is described in U. S. Patent 2,153,786 dated July 14, 1937. This featured a roll of aluminum wire, also enclosed within the vacuum chamber, which was continuously fed to a very large tungsten heater of

appropriate geometry. Such heaters had an average life of one hour and produced a rate of evaporation so that adequate metal coatings could be applied at web speeds up to 80 ft. a minute.

Although Alexander's original device demonstrated the feasibility of what is now described as the semi-continuous method of vacuum metalizing (See Figure 1), the relatively low speeds of coating and the high percentage of down time to replace heaters resulted in a relatively uneconomic procedure and emphasized the necessity of concentrating on the development of heaters with longer lives and higher evaporating rates. Several improvements in this area have taken place, starting in 1949 with the coated carbon heaters, and leading to the hard metal alloy units used today. The superior performance of the improved heaters is due in part to their enhanced electrical properties, in part to their increased resistance to corrosion by molten aluminum and, very significantly, by developments in the specific geometry of the item. As a result, the most advanced heaters now available will provide a service life of 10 to 12 hours and, depending on the web being metalized, can satisfactorily coat at rates in excess of 350 ft. per minute. Heaters with a 20-hour life expectancy under semi-continuous service have also been demonstrated in the laboratory and "life tests" suggest that this period could well be doubled under true continuous service wherein the unwind and rewind stands are located outside of the vacuum chamber and flying splices would make the detrimental cooling and reheating cycles unnecessary.

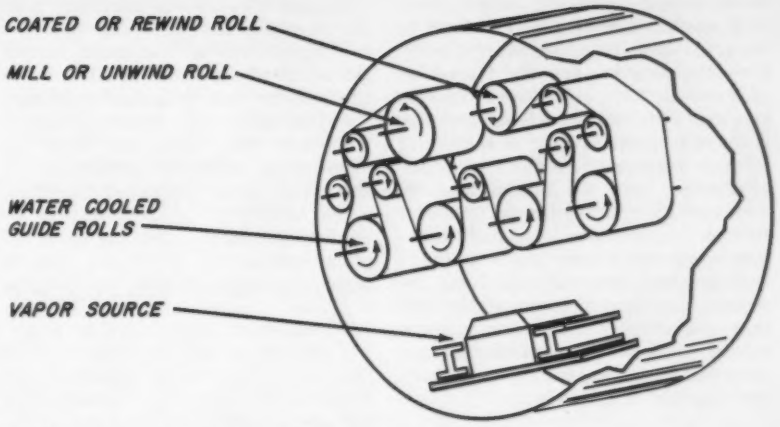


FIGURE 1—Schematic of semi-continuous metalizer

Paper Needs Pre-Conditioning

When metalizing plastic films and papers some pre-conditioning is generally necessary to eliminate most of the residual solvents and moisture normally present in such webs, for otherwise they would "out-gas" in the metalizing chamber, deteriorating the high vacuum and provide an atmosphere of molecules to deflect or slow down the gaseous metallic atoms. This would result in a dull, uneven and perhaps brown hued deposit on the web. In the case of plastic films, such pre-conditioning commonly consists of rewinding the stock roll under high vacuum conditions, in the presence of a heated idler. In the case of papers, it is equally satisfactory and more efficient to pass the web through a 250° F. or hotter oven and then immediately proceed to the metalizer before reabsorption takes place. Should any delays occur between pre-conditioning and metalizing, it is essential that the roll be securely overwrapped in a moistureproof encasement.

Not all plastic films may be successfully metalized. Even with the pre-conditioning described above, some films with excessive amounts of comparatively volatile plasticizers will "out-gas" in the metalizing chamber and yield unattractive results. Other films are unsatisfactory for use in this process because of their tendency to deform in the presence of the heat generated by the process. Still other films appear to metalize satisfactorily after pre-conditioning, but the quality of the metal coating degenerates in a matter of a few days or a few weeks. Such degeneration may be a loss of adhesion between the metal coating and the base sheet, a discoloration of the metal coating or both.

Not all films are metalizable in all gauges. For example, low density polyethylene tends to soften and elongate under the metalizing temperatures when processed in gauges significantly under four mils, and oriented films tend to be troublesome, especially in wider width. Certain plastic films, such as polyethylene and K type cellophanes, are either so free of volatile constituents or have such relatively impervious surfaces that pre-conditioning is not required as no out-gassing occurs in the metalizer, especially if the film is processed at a relatively high speed. It is also noted that to obtain satisfactory adhesion of a metal coating on any of the polyolefins, it is essential that they first be exposed to flame or an electronic treater, to produce a polar surface.

Smooth Finish Before Metalizing

A great many types of paper may be successfully metalized insofar as depositing a metallic coating is concerned, but for the most part such coatings on paper are a dull gray in appearance, resembling papers that have been printed with a poor quality of metallic ink. Even to attain this type of metalization, it is essential that the paper be thoroughly dried to remove most of the moisture. Moisture content must be a maximum of two per cent and preferably appreciably lower to avoid out-gassing, with the resultant blushing and off-color of the metallic deposits.

While most papers are completely unattractive when metalized, progressively more gloss and metallic sheen can be obtained the smoother and denser the surface is made. Thus supercalendered papers do acquire some degree of gloss, and glassine acquires even better appearance. However, to obtain a true brilliance approaching that of metalized Mylar, and equalling or surpassing aluminum foil itself, it is essential that a paper be provided with some sort of a smooth, impervious, organic finish before metalizing.

Cast-coated papers are superlative in this regard but their high cost makes them non-competitive in many

"The thermal evaporating process is much to be preferred over cathode sputtering, the two principal factors being speed and versatility."

fields where metalized paper products would otherwise be expected to be commercially important. Therefore, reliance is normally placed on papers which are coated with organic lacquers by some direct process. Numerous coating techniques and lacquer formulations have been investigated, and no one method or material has proven to be the best for all applications. Lacquer coatings, providing the most brilliant end product, for example, may be deficient in heat resistance for certain usages. Other lacquer systems having good heat resistance may not provide adequate water resistance for another application.

Applications of Metalized Paper

There is a limited usage of metalized plastic films and paper in functional applications, the vast majority of uses being entirely decorative. Functionally, these metalized webs may be used in electrical applications since it has been found comparatively easy to control surface resistivity of such metallic deposits on dielectric materials such as Mylar and paper. Of course, in electrical applications, the high brilliance sought in decorative uses is not essential, and therefore metalizing directly onto uncoated paper is a common practice. Metalized webs are also used functionally for their reflectivity, metalized Mylar being an important factor in the construction of high altitude weather balloons and space balloons.

The decorative applications of metalized films are numerous, the largest single market probably being that of decorative yarns so commonly seen in automotive upholstery. Metalized films have also been used widely in women's shoes and clothing, the interior decoration of automobiles and aircraft and as Christmas tree tinsel.

Decorative uses of metalized paper are principally in the field of packaging. Overwraps (especially gift wraps), labels and bags fabricated of metalized paper are daily becoming more common.

In the packaging field metalized papers compete primarily with the more conventional foil-paper laminated structures that have been used for years. Because foil is an excellent barrier to gases and moisture vapor, while the thin metallic deposit attained by vacuum metalizing is not, there are many applications where the metalized paper product will not be acceptable. But where foil is used primarily for decoration, the more brilliant metalized paper has a number of advantages. Thus while currently selling at essentially the same price as foil-paper labels, metalized paper labels afford a number of advantages that can be economically significant. For example, the metalized paper label does not "draw" or "burr" in sheeting or stamping operations. On the other hand, foil-paper products, when die-cut or sheared, tend to be slightly drawn at right angles to the plain surface of the sheet, and to form tiny burrs. These burrs make it possible for two or more labels to cling together, and thus the applying of two to five foil labels rather than one occurs from time to time. This waste-producing defect does not occur with the metalized paper.

A second significant virtue of the metalized paper label is the fact that the extremely thin metallic coating is not a true barrier, and therefore, if a proper choice of an organic lacquer has been made, the tendency of this product to curl under changing humidity conditions can be minimized or virtually eliminated, an achievement that is virtually impossible in the case of foil-paper labels. The tendency of the foil type label to curl when exposed to an atmosphere appreciably dried or more humid than that in which it was manufactured, is a constant source of difficulty.

"In the packaging field metalized papers compete primarily with the more conventional foil-paper laminated structures that have been used for years."

Thickness of Coating

Repeated reference has been made to the fact that the aluminum coating applied to metalized films and papers is extremely thin. Normally, for packaging applications, aluminum is deposited in the thickness of three millionths of an inch on a substrate. A very uniform brilliant coating is attained at such a thickness, but it is nevertheless transparent when viewed against a strong light source. Such a metal thickness, which may also be expressed .0782 microns or .020 milligrams per square centimeter, exhibits a surface resistivity of 1.5 to 2.0 ohms per square as measured in accordance with ASTM-D-257 and is independent of the spicific identity of the dielectric plastic film or coated paper.

Heavier coatings than 3×10^{-6} inches can be attained by reducing operating speeds. Some metalized yarn manufacturers require an entirely opaque film which necessitates a deposition of approximately 4.5×10^{-6} inches, which deposit has a surface resistivity in the order of 0.5 ohms per square.

As previously pointed out, these very thin coatings of aluminum have relatively little effect on the gas and moisture transmission rates of most films, but the significance of any effect has been found to vary with the base film used. The most significant decrease in moisture and gas transmission rates yet measured for a film with a 3×10^{-6} inch coating has been found in the case of ½ mil Mylar where they were reduced to 1/5 of their normal values.

One possible explanation of the exceptional improvement in barrier properties of Mylar when metalized is that the extreme smoothness of this plastic sheeting allows the aluminum molecules to be deposited in a more continuous pattern, with less microscopic pinholes than would be the case with a slightly rougher film. Greater improvement in gas barrier properties of all films are achievable by heavy, opaque metal coatings, but this appears to be an uneconomical approach to obtaining these characteristics.

Metalization, per se, has no recognizable effect on the tensile strength or elongation of plastic films or papers, but excessive chamber temperature may effect the physical properties of an oriented film, for example, by allowing some relaxation of the orientation. Preconditioning of some films, such as cellophane and paper, to remove moisture prior to metalization, as previously indicated, also has a decided effect on the flexibility of the web and on related properties. But, these changes may be reversed by humidification after metalization.

All metalized coatings are extremely soft and in general are readily removed by abrasion, even though their adhesion is such as to resist removal by the "Scotch Tape Test". However, resistance to abrasion may be attained by the use of overlacquers.

Printing Metalized Webs

The printing of metalized films and papers involves a number of special problems. In the case of

transparent films, design and color may be imparted to a metalized sheet in three ways. The film may initially be reverse printed with opaque inks of a type normally used with the film in question, after which the same side of the film is then metalized so as to trap the ink. Thus from the face of the film, one observes alternately opaque printed design and brilliant silver reflectance. It is obvious that inks used in this application must not only adhere to the base web, but must be essentially completely free of solvent so as not to destroy the vacuum in the metalizing chamber. It is, of course, essential that the metal adhere well to the ink but there is no necessity that a brilliant metalization be achieved, since any dull metal areas behind the opaque ink are completely hidden.

A second way of decorating metalized transparent films is to apply an overall tinted lacquer to the film prior to metalization. This creates a multitude of problems since besides using a base resin that has good adhesion to the plastic film, it is essential that the overlacquer be capable of accepting brilliant metalization. Lastly, so as not to obscure the metallic appearance, one is restricted to the use of small quantities of dyes to obtain the desired tints, and light-fastness of such pale tints is most difficult to achieve, especially when it is considered that because of the higher reflectivity of the metal coating, all light striking the surface of such a film actually passes through the film twice, and in effect subjects the dye in the tint to "double exposure."

Lastly, it is feasible to metalize a transparent film in the normal manner and then apply a transparent tinted overlacquer over the metal. This somewhat simplifies the problem in that the lacquer base does not have to be one that will metalize brilliantly.

In all three methods of decoration, exclusive of the other limitations, it is essential that the overlacquer or ink system be one that is suitable for the base web. Whether it is applied directly to the plastic film or over the metalized surface of the plastic film, the question of adhesion to the plastic film appears to be paramount and the problem of obtaining a composition such as a foil ink, which one would expect to be required to adhere to a metalized surface, does not arise. For example, cellulose nitrate base overlacquers are preferred in the case of metalized cellulose triacetate, while polyamide base lacquers are preferred in the case of metalized polyethylene.

Overlacquering and Ink Systems

The printing and overlacquering of metalized papers also has its special problems. The ink system selected is primarily a function of the lacquering system applied to the paper to form a suitable surface for metalization, but with the metalizing papers most commonly used, a wide tolerance of ink systems normally exists if the metalized stock reaches the press in proper condition.

The problems involved in printing "poisoned" aluminum foil are well known, and these problems exist in an aggravated form in the case of metalized paper. In the manufacture of printed overwraps and labels from foil, the first operation involves the adhesion of the thin foil to a paper web. When this stock is rolled up, the entire aluminum surface that is to be printed is in contact with a moist paper surface. If this contact is maintained for any significant period of time, the foil becomes progressively more difficult to wet with ink and thus to print, until after a few days printing is virtually impossible.

"The problems involved in printing 'poisoned' aluminum foil exist in an aggravated form in the case of metalized paper."

This difficulty is readily resolved by applying a shellac type primer to the exterior surface of the foil in line with the laminating operation, so that the exterior foil surface never actually contacts the paper surface against which it is wound.

In the case of metalized paper, the problem is more complex and less simply resolved. It is impossible to incorporate a priming station inside the vacuum chamber of a semi-continuous metalizer. Therefore, it would appear advisable to remove the metalized paper roll from the vacuum chamber and initiate the printing operation as expeditiously as possible. However, this is not practical since roll formation under vacuum conditions is so poor as to necessitate rewinding prior to any press operation. Of equal importance is the fact that the dried paper web is so weak as to repeatedly break when placed under the tensions normal in a press.

In view of these facts, before printing, it is essential to simultaneously rewind the metalized roll and re-hydrate the paper. This overcomes the problems just described, but creates another. Re-hydration of the cellulose fiber is a relatively slow process and even though the necessary quantity of moisture is applied to the cellulosic web, some hours are involved in reconstituting the physical properties of the paper. Simultaneously, the presence of the water on the surface of the paper accelerates the "poisoning" of the metallic coating in contact with it. Thus, best web strength results from waiting for equilibrium conditions, but best printing results demand minimum waiting.

These circumstances have significant bearing on the ink system used for printing. If no "poisoning" has occurred, a shellac primer followed by nitrocellulose or polyamide base inks may be satisfactory. If some "poisoning" has taken place, the shellac primers are inadequate and other primers must be applied, depending on the degree of the undesirable effect. The nature of the primer required may drastically limit the ink systems that can be used in conjunction therewith. For example, extreme "poisoning" can be overcome only by the use of vinyl base primers, which in turn, when employing a gravure system, can only be followed by vinyl inks whose difficult working properties make them much less desirable to handle than either nitrocellulose or polyamide base inks.

True Continuous Metalizing

The obvious solution to the problems inherent in printing metalized paper lies in the development of true continuous metalizing equipment, wherein the paper stock runs from let-off rolls equipped for flying splices, through drying ovens, thence through vacuum locks into the vacuum chamber for metalizing, out through vacuum locks once again, through hydrating and priming stations to a rewind unit equipped with automatic web alignment. Such an installation would not only resolve the printing problems, but would so decrease overall manufacturing operations as to make metalized paper a basic commodity in the flexible packaging industry.

Raw Material Prospects For The Colombian Paper Industry

Walter L. Bender,
Timber Management Specialist,
U.S. Operations Mission to Colombia

Stand of Cativo in the Atrato River area.

Colombian tropical hardwoods are being used for the first time in the manufacture of paper. In July 1959, Cartón de Colombia in Cali (Valle) began experimenting with local tropical hardwoods for this purpose. They will be followed soon by Pulpapel in Barrancabermeja (Santander). This is only the beginning of using Colombia's forest resources instead of imported pulp.

The first major paper plant started production in Colombia in 1944. Numerous small plants followed and have been producing various grades of paper. These have been made principally from imported long-fibered pulp, waste paper and some bagasse. Raw materials from Colombian forests, which cover 50 per cent of the country's total area of 1,138,000 square kms (440,000 miles), were never used.

The Agricultural Servicio (STACA), a cooperative entity of the Colombian Ministry of Agriculture and the U.S. Operations Mission to Colombia (Point IV), has supported efforts of groups interested in developing the pulp industry in Colombia. Technical assistance has been given in making pulpwood resource surveys of various forest areas.

U. S. technical assistance to Colombia in the field of forestry goes back to 1954 when the first cooperative watershed management project was established in Medellin, Antioquia. Similar projects were subsequently established in Cali (Valle) and Neusa (Cundinamarca) for introduction of forest protection, management and utilization practices, and training of Colombian personnel.

A major field of assistance is the development of programs, policies and practices for the National Forest Service established in 1958. Training of professional and sub-professional forestry personnel is another important phase of the cooperative forestry program.

Consumption Rise

It is estimated that consumption of paper in Colombia will rise from 112,000 tons in 1960 to 150,000 tons by 1965.

Packaging is relatively new in Colombia, but it is moving ahead at a pace probably faster than it has in the United States. As consumers become acquainted with purchasing their needs in nicely done containers, they will not go back to the old banana-leaf variety of wrapping.

The source of pulp for paper consumption will continue to come from waste paper, bagasse, imported long-fibered pulp and Colombian hardwoods (short fibered pulp). In 1960 approximately 8,000 tons of pulp will be produced from Colombian hardwoods. By 1965 this production should have reached 27,500 tons, an increase of approximately 3½ times.

Needs of the Industry

The increased use and development of local pulp resources for the Colombian paper industry require:

- Continued testing of hardwoods for pulping and paper making characteristics.
- Managing the tropical forest for production of pulpable species.
- Local production of long-fibered coniferous pulp.

Hardwood Testing

The use of tropical hardwoods, while sure to increase, necessitates considerable experimentation before it will be usable as standard pulp in some types of paper and board. Also, production costs must be competitive with those of other local materials such as bagasse and waste paper.

Cartón de Colombia intends to establish a small laboratory at its plant in Cali for testing various woods for pulping characteristics. This would be the first of its kind in Colombia and would save much time and money in making it possible to do the testing in the country. In the meantime, this company continues to experiment making paper and board on a commercial scale with various tropical hardwoods. They are able to use some quantities of tropical hardwoods since they are making a number of different grades which require different strength properties.

One interesting point is the reluctance of some consumers to accept paper made of tropical hardwoods because of a change in color and texture, even though the paper has the same strength characteristics.

The use of hardwoods in the manufacture of newsprint is rapidly becoming a technical and economic probability. Hardwoods are currently being used to some degree by three newsprint mills in the United States.

Experiments conducted with Colombian woods at the Forest Products Laboratory in Madison, Wis., show some advantage for newsprint, according to G. H. Chidester, chief of the Pulp and Paper Division. Some of the species produced a good quality groundwood which could either be used in blends with long-fibered pulps or with long fiber and cold soda pulp. The best combination obtained to date is a combination of 60 per cent aspen groundwood, 15 per cent cold soda pulp from mixed hardwoods (which Cartón de Colombia is pro-

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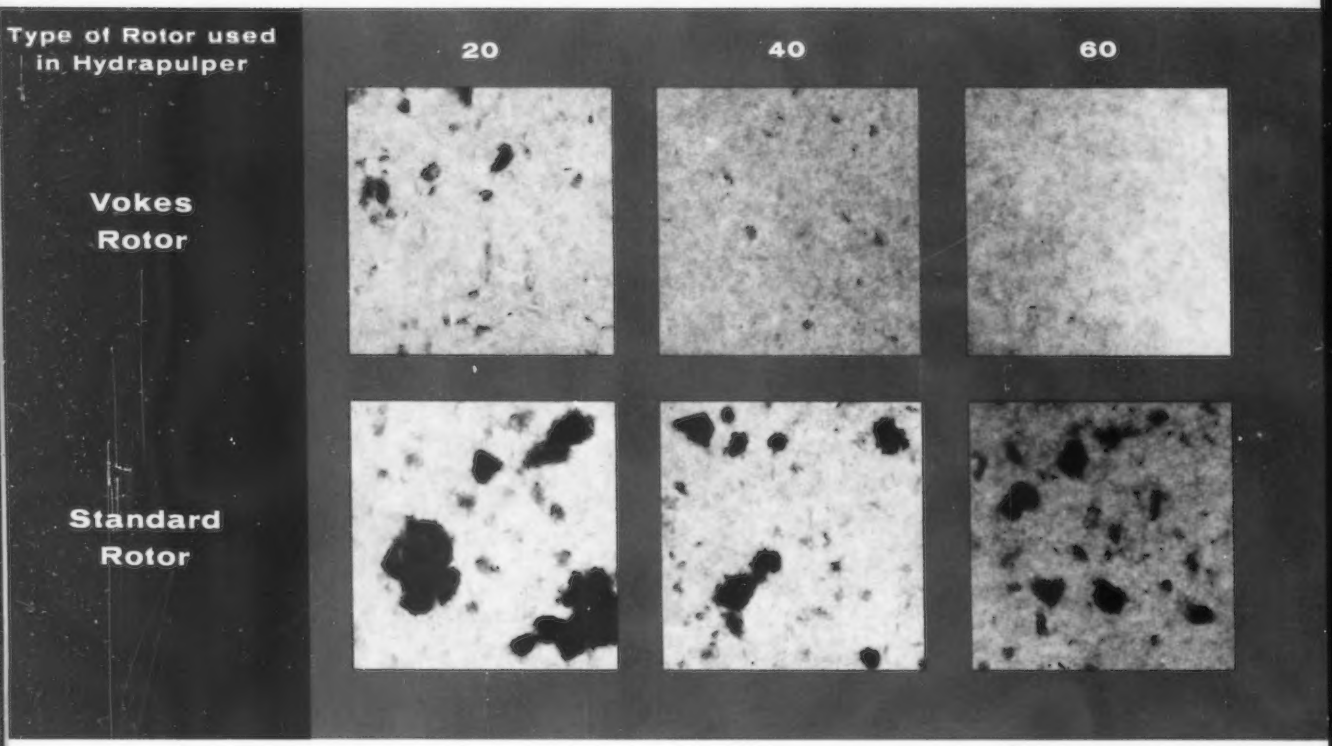

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ducing), and 25 per cent long-fibered pulp.

Management of Tropical Forests

It is in the field of tropical silviculture for pulpwood production where technical assistance from the Colombian government could be of great help to industry. Not even the forestry profession knows much about this field. But answers will have to be found.

Cartón de Colombia has obtained a 15,000 hectare forest concession. The eventual silviculture will probably have to be a compromise between species that can be regenerated after initial cuts and species that have good pulping qualities.

Preliminary tests made outside the country indicate that Sajo (Cunnusperma panamensis) has desirable pulping and paper making characteristics. The pure stands of Sajo, containing an estimated 90 to 100 tons of wood per hectare, extend further south on the Pacific Coastal area. The Sajo forest appears to be a promising resource, though at present, shipping costs to Buenaventura make them more expensive to the company than the Buenaventura woods.

Preliminary tests on Cativo (Prioria capaifera) made at the Forest Products Laboratory also indicate that it might serve the pulp industry. This species grows in pure stands in the Atrato drainage (Choco). It is now exported for veneer and lumber.

Growth of Conifers

Coniferous plantations are the answer to an ever increasing demand for long-fibered pulp. Colombia is in an excellent position to develop coniferous plantations. There is a ready market for all pine pulpwood that is produced. Cartón de Colombia alone estimates that they can use the growth of 50,000 hectares of pine. The climatic zones for good pine growth exist, and there are available preliminary data on the growing of various pine species in Colombia.

Establishment of pine plantations in Colombia is a project that deserves full governmental support. It involves selection of areas within the climatic zones favorable to pine development, selection of species, and establishment of large plantations. With the establishment of numerous experimental plots for adaptability studies, STACA has taken the first step in the introduction and selection of species in different altitudinal and climatic zones. Species like Florida slash pine (Pinus elliotii) and Pinus patula (a mexican pine) have had exceptional growth (14 feet and 12 feet height respectively in 2 to 3 years).

Automatic Tension Release Jack Saves Felts

(Submitted by Albany Felt Co.)

Probably most papermakers have had occasions when felts have torn or become damaged when changing grades, at start-up, or by stock building up on the rolls. When a machine is "struck in," a great load is momentarily placed on a relatively short length of felt, particularly on cylinder machines. Sometimes a cylinder mould will suddenly tighten up. Even though these strains are of short duration, it is possible to tear a felt.

For a number of years this problem of felt damage has been minimized at Fibreboard Paper Products Corp., Stockton, Cal. They use an ingenious, automatic tension release take-up jack which effectively absorbs sudden changes in load. Although jacks of this type are not new to the industry, it is believed their usage is relatively small.

The accompanying diagram outlines the basic features of this installation. Modifications could be made by individual mills to adapt it to their operation. It consists of a felt hitch roll "A" mounted on a greased shaft "B." A 70-inch cable is fastened to the housing of this roll. This cable passes around sheave "C," then around, a six-inch sprocket "D" and back to the housing of roll "A."

Mounted on the shaft (which runs from the front to the back side of the machine) is a drum around which cable "E" is wound. By weighting the end of the cable at point "F," the desired tension can be maintained on roll "A." When a sudden increase in load occurs, this roll can move freely toward the short end of the greased shaft. When the load is released, the roll will then return to its former position.

At Stockton, this jack adjusts a felt 200 feet long and 126 inches wide on the bottom position of an eight-cylinder machine. After the felt is installed and during wetup, two weights are used on either side for a total of five or six hundred pounds. When the felt is broken in, about 400 pounds of weights are used on each side for a total of 800 pounds holding the semi-"floating" takeup felt roll. As the felt gets older and gradually goes out on the tension jack, a system employing a hitch roll is used to keep the felt within the limits of the tension jack.

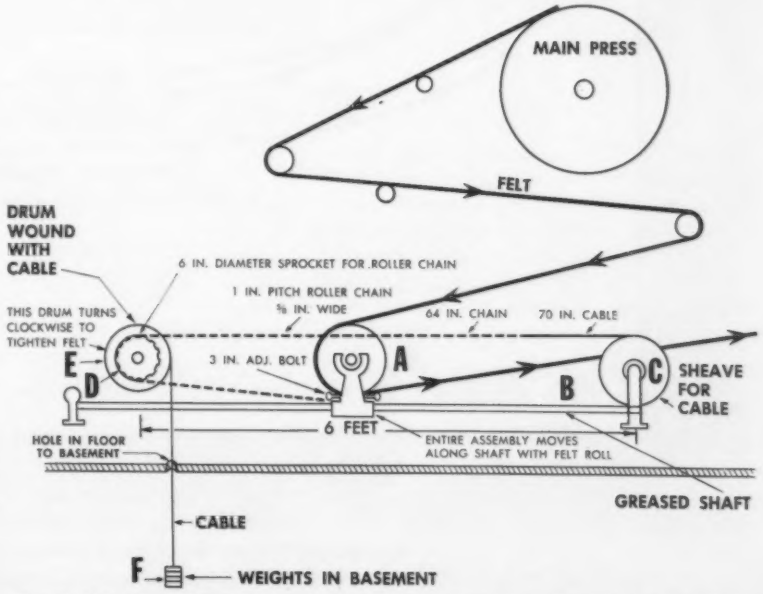
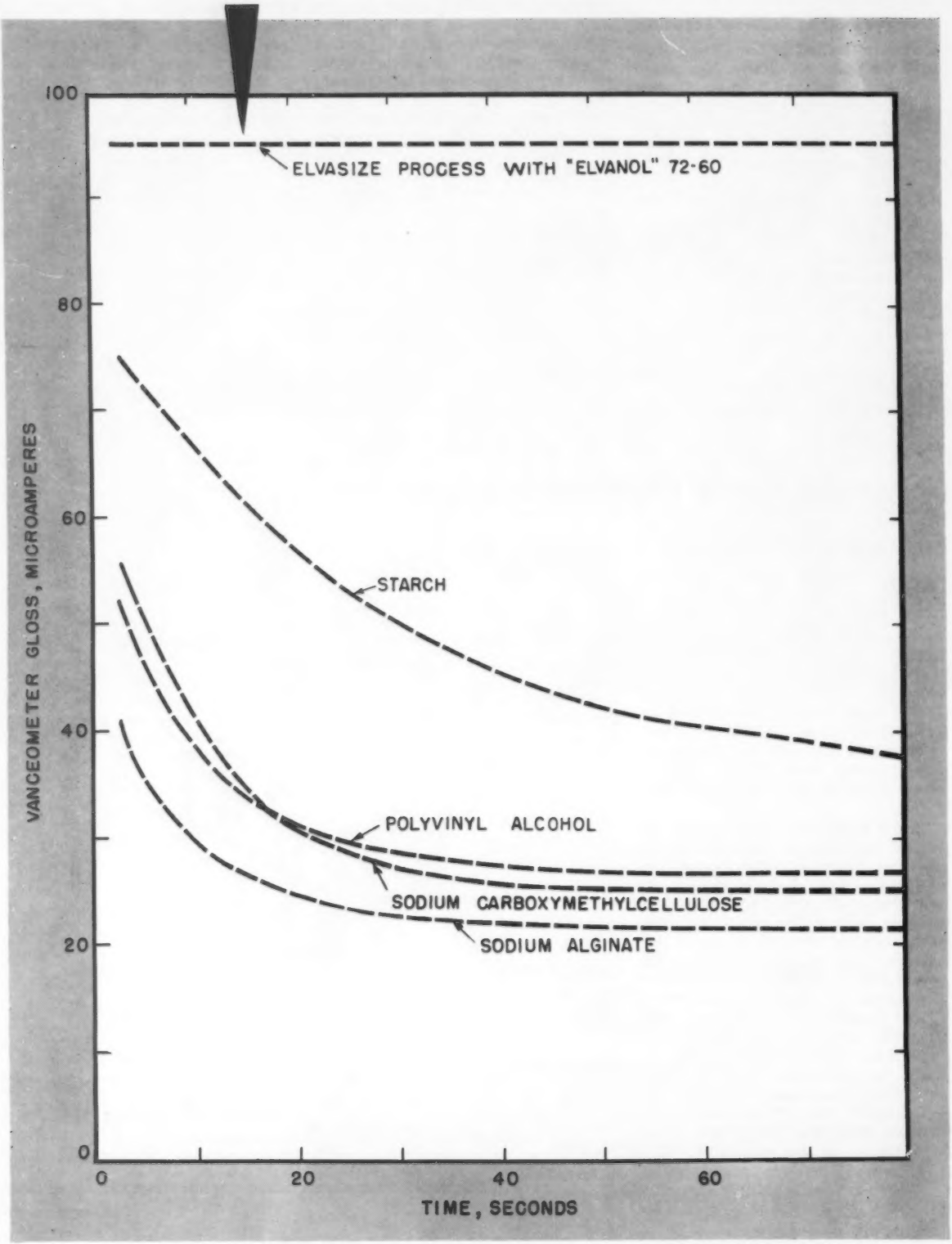


Fig. 1—Side view shows features of Automatic Tension Release Jack installation.

Tops other surface sizes



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Kraft, Blchd. Hdwd.	152.00/ —		140.00/ —		
Kraft, Semi-bleached.	140.00/145.50				
Kraft, Unbl.	117.50/125.00	125.00/130.00	†125.00/130.00	125.00/ —	
Sulphite, Blchd.	‡150.00/155.00	‡150.00/155.00	*155.00/ —	*155.00/ —	155.00/ —
Sulphite, Bl. Hdwd.	150.00/ —				
Sulpnite, Unblchd.	135.00/ —	135.00/ —	†135.00/ —	*135.00/ —	
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4	7.00/6.25	6.50/6.25	6.50/6.25	7.00/ —
5	6.25/5.75	6.00/5.75	6.00/5.50	6.50/5.75
6	5.75/4.75	5.25/5.00	5.25/5.00	4.25/3.75
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No. 1 News	12.00/ 13.00	10.00/ 11.00	13.00/ —	12.00/ —
Overissue News (Lg. size)	11.00/ 13.00	9.00/ 11.00	18.00/ —	18.00/ 19.00
Mill Wrappers	19.00/ 22.00	9.00/ 11.00	9.00/ —	12.00/ 14.00
Old Corrugated Containers	19.00/ 20.00	17.50/ 18.00	20.00/ —	21.00/ —
Super Resorted Kraft Paper	35.00/ 40.00	— / —	30.00/ —	55.00/ —
New Double Kr. Ld. Corr. Cuts	32.50/ 35.00	37.50/ —	35.00/ —	32.50/ 35.00
(Semi-chem. medium)	47.50/ —	40.00/ 47.00	45.00/ —	— / —
New 100% Kraft Corr. Cuts	40.00/ 42.50	— / —	57.50/ —	— / —
New Br. Kraft, Env. Cuts	70.00/ 75.00	70.00/ 75.00	52.50/ —	60.00/ —
New Br. Kr. Bag Waste Prntd.	55.00/ 60.00	55.00/ 65.00	52.50/ —	55.00/ —
New Br. Kr. Bag Waste Unprintd.	60.00/ 65.00	65.00/ 70.00	60.00/ —	60.00/ —
No. 1 Groundwood Shvs.	25.00/ 30.00	23.50/ 27.50	15.00/ —	32.50/ 35.00
White Newsblanks	42.50/ 45.00	47.50/ 52.50	30.00/ —	55.00/ —
No. 1 Soft White Shvs.	60.00/ 65.00	60.00/ 65.00	60.00/ —	70.00/ 75.00
Super Soft White Shvs.	65.00/ 75.00	75.00/ 85.00	70.00/ —	— / —
Hd. White Shvs.	85.00/ 90.00	90.00/100.00	85.00/ —	85.00/ 95.00
Hd. White Env. Cuts	100.00/105.00	110.00/115.00	90.00/ —	110.00/113.00
Col. Tab. Cards	42.50/ 45.00	50.00/ 57.00	45.00/ —	35.00/ 40.00
Manila Tab. Cards	62.50/ 65.00	60.00/ 70.00	65.00/ —	65.00/ —
No. 1 Col. Ledger	32.50/ 35.00	32.50/ 37.50	40.00/ —	27.00/ 29.50
White Ledger	45.00/ 50.00	47.50/ 52.50	50.00/ —	50.00/ 55.00
Mixed Book & Mag.†	— / —	— / —	12.50/ —	— / —
No. 1 Books‡	16.50/ 19.00	22.00/ 24.00	27.50/ —	10.00/ 14.00

† Includes Time & Life; no coarse groundwood. ‡ Not to exceed 10% of groundwood.

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INCREASES PRODUCTION AND ACCURACY

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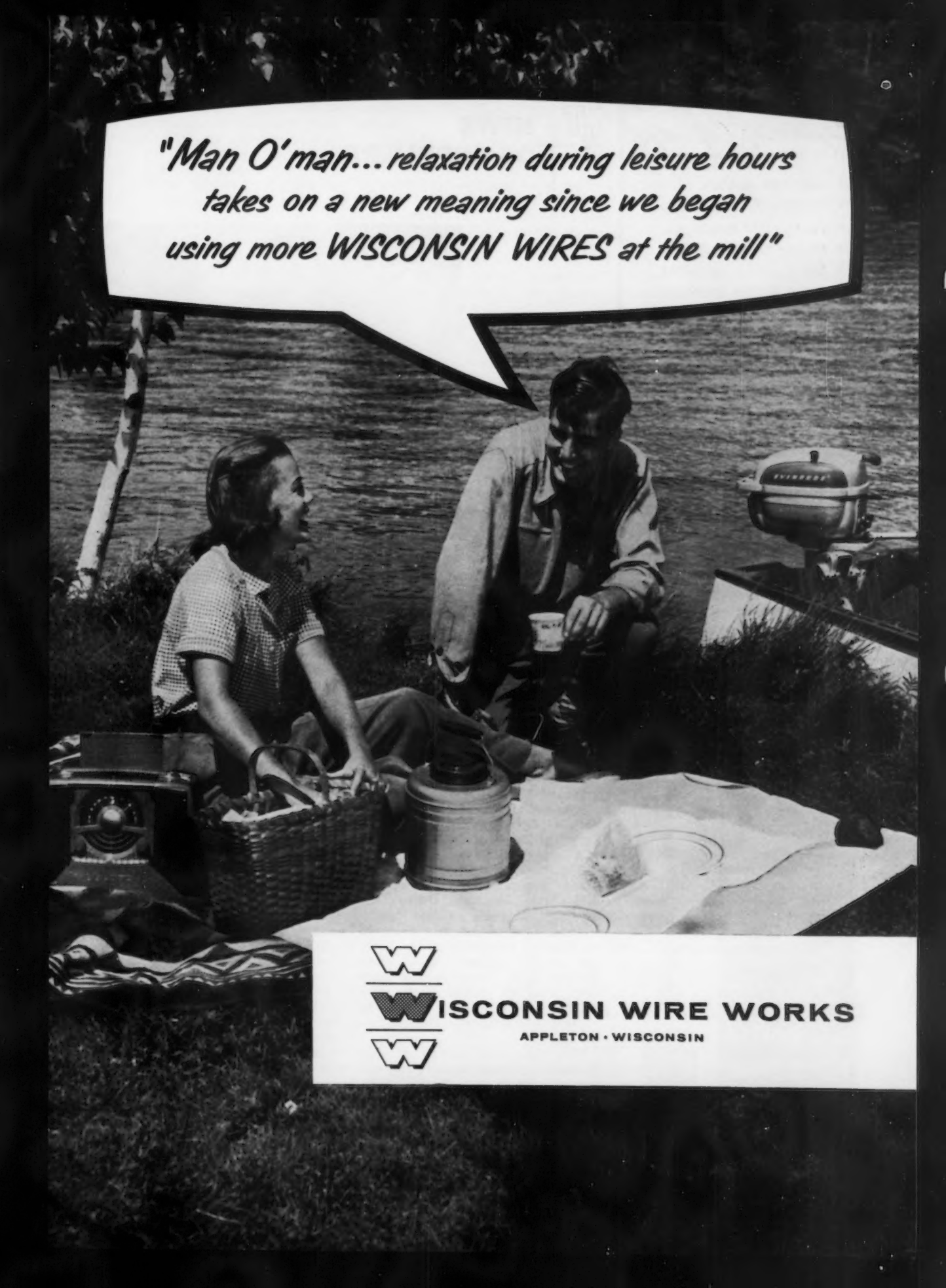
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- Self Cleaning SHOWERS
- FRESH WATER SHOWERS

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C. S. Connington, Barre, Mass.

Buffalo Rubber & Supply Inc., 526 Niagara St., Buffalo 1, N. Y.

E. C. Jacobi—H. D. Wake—P. R. Bruce, 746 So. Quincy St., Green Bay, Wisc.

William P. Dapses, 2055 Lansing Ave., Salem, Oregon

Pulp & Paper Mill Accessories Ltd. Box 903 Montreal, Quebec

E & M Lamort Fils, Vitry-le-Francois (Marne) France

Joseph Winterburn Ltd., Bury, Lancs., England

PJT NEWS OF SUPPLIERS

General offices of Joseph T. Ryerson & Son, Inc., Chicago.

Joseph T. Ryerson & Son, Inc., warehousing subsidiary of Inland Steel Co., has moved its general offices into the firm's new general office building recently completed at 2621 W. 15th Place, Chicago, Ill. The location is adjacent to Ryerson's Chicago plant, oldest and largest unit in the company's nation-wide group of 20 steel service centers.

Ryerson is the country's largest national distributor of steel, aluminum, industrial plastics and metal fabricating machinery.

The new, two-story, 210-foot-square general office building was designed by Skidmore, Owings and Merrill, nationally known architectural firm, which has designed outstanding structures as the U. S. Air Force Academy in Colorado Springs, Lever House in New York City, and the Inland Steel office building in Chicago's Loop. The general contractor was Sumner Sollitt Co.

The Ryerson company was founded in Chicago in 1842 and was merged with Inland Steel in 1935. In addition to Chicago, Ryerson operates fully integrated plants at Boston, Buffalo, Charlotte, Cincinnati, Cleveland, Dallas, Detroit, Houston, Indianapolis, Los Angeles, Milwaukee, New York, Philadelphia, Pittsburgh, St. Louis, San Francisco, Seattle, Spokane, and Wallingford, Conn. Formerly the general offices were located in the Ryerson Chicago plant office building, 2558 W. 16th St. The space freed in the older office building by the move will be utilized for expansion of office facilities at the Chicago plant.

Joy Manufacturing Co., Pittsburgh, Pa., has elected George R. Fox, works manager of Joy plants in Franklin, Pa., since 1953, vice president of manufacturing, Joy International, S. A., a wholly owned subsidiary which guides the company's overseas operations from headquarters in Monaco. Joy produces mining, air handling, construction and oil field machinery.

In his new position Mr. Fox will work on manufacturing matters with Joy's wholly-owned manufacturing subsidiaries in Australia, France, Great Britain and South Africa. He will also handle liaison between these operations and Joy's eight manufacturing plants in the United States. A native of Owosso, Mich., Mr. Fox has been with Joy in various executive capacities since joining the company in 1945.

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chicago
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jersey city
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oakland
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PIONEER PAPER STOCK COMPANY

graders and packers of waste paper

John W. Bolton & Sons, Inc., and **The Emerson Manufacturing Co.**, Division, Lawrence, Mass., has appointed Malcolm G. Cole and Benjamin O. Williams sales representatives. Both will cover territories in the Northeast Region.

Mr. Cole, formerly with the National Gypsum Co., will cover the

M. G. Cole

B. O. Williams

northern New England territory and make his headquarters in New Hampshire. Mr. Williams, who has been calling on New York State paper mills while representing the Anderson Instruments Co. will represent Bolton-Emerson in the New York State territory and reside in Utica.

American Cyanamid Co. has announced that it will start construction next week of a plant at Vancouver, Wash., for production of chemicals for the paper industry. It is expected to be in operation early next year. The plant will produce resins chiefly for wet strength.

American Viscose Corp., Philadelphia, has named David S. Collingwood as sales representative in Boston for its Industrial Packaging Department. He is headquartered at American Viscose's Film Division district sales office at 80 Federal Street, Boston 10. Mr. Collingwood, who was Philadelphia sales representative for the new Industrial Packaging Department, is working under the New York district sales office.

A native of Philadelphia, Mr. Collingwood joined American Viscose in 1960, at the time the Industrial Packaging Department was being organized.

"Avistrap" Cord Strapping is the first product of the Industrial Packaging Department. It is a high-tenacity rayon cord which represents a new idea in industrial packaging, and features economy, ease of handling, and safety.

Much lighter in weight than steel strapping, Avistrap effects major economies in handling, and permits the use of lighter cartons and containers, which in turn reduces shipping costs. The new Avisco strapping has no jagged ends and therefore cannot cause injury to shipping personnel; in addition, the rayon material may be easily and economically imprinted for easy identification.

In addition to the new Boston sales representation, the Industrial Packaging Department of American Viscose has district sales offices in eight key cities, and is establishing a nation-wide network of more than 100 distributors.

"They'll probably use this one to make that highly absorbent tissue."

GILBERT and NASH AIR OPERATED felt and wire guide

New . . . Simple . . . Compact. Now operating on machines at speeds over 2,000 fpm, the Gilbert and Nash Air Guide reacts quickly with reliability and precision.

Although entirely air operated, this new guide uses air only when a correction is made. What's more, "swing roll" effect or guide roll oscillation is completely eliminated.

Guide roll is held stationary if air supply is interrupted . . . there are no springs to pull guide roll with possible damage or loss of wire or felt.

Complete standardization of *all* guides can be easily accomplished because the same model air guide is used for wires, wet and dryer felts.

We invite you to request for our representative to call.

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SOUTH CAROLINA

PAPER TRADE JOURNAL is always mailed on Friday and should be received in most parts of the country early in the week. If there seems to be undue delay in receiving your copy, we suggest that you write your local postmaster, with a copy to the postmaster at East Stroudsburg, Pa., where we mail, and a copy to us.

PJT NEWS OF CONVERTERS

O-I Paper Products Promotes Kiddie

E. J. Kiddie has been named general manager of the Detroit corrugated box plant of the Owens-Illinois Paper Products Division.

Mr. Kiddie, who served briefly as production manager of the Detroit plant in 1955-56, most recently was assistant general manager and sales manager at the division's Jacksonville, Fla., facility. He has been in the paper business 10 years and has also served at O-I installations in Tomahawk, Wis., Chicago and Madison, Ill.

In Detroit he will be responsible for the sales, administration and production activities of the plant, which markets corrugated boxes in most of Michigan and Northern Ohio.

Wilmer Advances to New Post at PCA

G. Ronald Wilmer, 30-year container industry veteran, of Grand Rapids, Mich., has been appointed to the new position of general superintendent, container plants, of Packaging Corp. of America.

Mr. Wilmer will assist the company's container plant personnel in their operating problems, and will help them improve production methods and equipment. Mr. Wilmer will make his headquarters in Grand Rapids where for the past nine years he has been superintendent of the company's Grand Rapids container plant. Prior to his career with PCA and American Box Board Co., one of its three predecessor firms, he was with Hygrade Containers, Ltd., of Canada.

Westvaco Names Manager For St. Louis Bag Plant

Shelton J. Jones has been appointed manager of the St. Louis plant of West Virginia Pulp and Paper Co.'s Multiwall Bag Division, it was announced by Victor S. Luke, division manager.

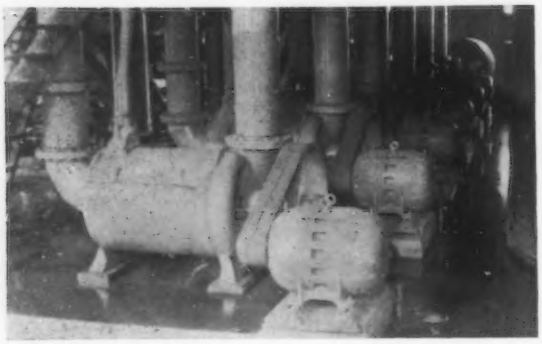
Formerly plant production manager, Mr. Jones succeeds Allen G. Woodruff who resigned.

Starting at the Charleston, S. C., mill in 1952 as a special projects engineer, Mr. Jones helped develop extensible paper introduced by West Virginia more than two years ago. He transferred to the St. Louis plant in 1959.

Hudson P&P Names Multiwall Product Manager

Howard Brody has been appointed product manager of Hudson Pulp & Paper Corp.'s Multiwall Division.

Mr. Brody, formerly assistant to the sales manager of the division has been associated with Hudson for three years where he has had a wide range of experience in the sales, marketing and technical problems of the multiwall industry.



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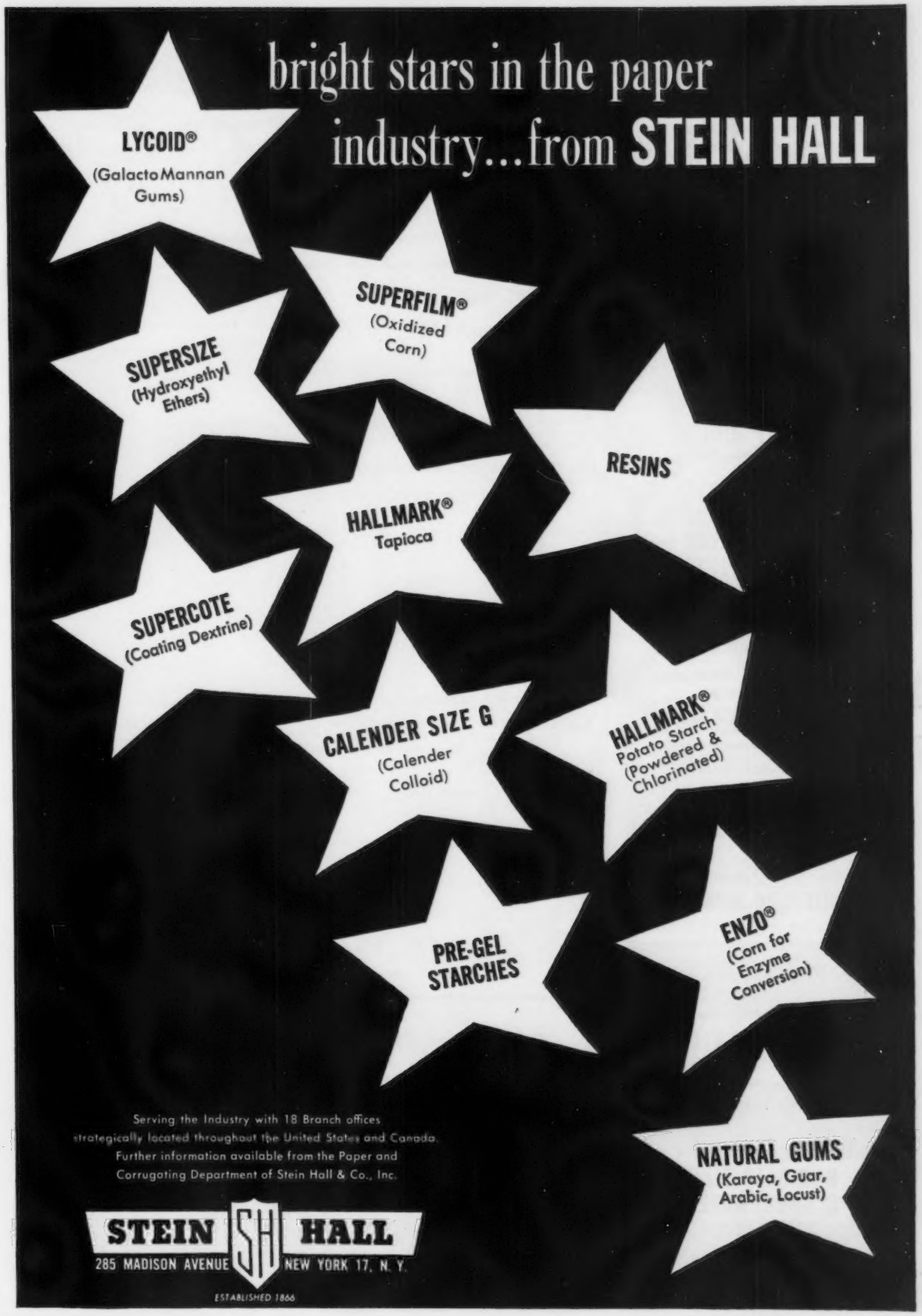
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Figures of the Week

PAPER PRODUCTION RATIO REPORT—American Paper & Pulp Assn. Figures

(Production as per cent of normal capacity)

COMPARATIVE WEEKLY SUMMARIES

		Aug. 20	Aug. 27	Sept. 3	Sept. 10	Sept. 17
	1960	93.0	94.5r	90.2r	72.6r	92.4
		Aug. 22	Aug. 29	Sept. 5	Sept. 12	Sept. 19
	1959	96.7	95.4	96.2	78.0	98.5

r Revised.

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1960	96.5	97.7	98.0	97.0	97.7	96.2	81.3‡	91.8‡	—	—	—	—	—
1959	87.8	90.5	93.2	94.4	95.5	95.6	84.5	96.0	92.4	97.4	96.2	86.6	92.2

‡ Preliminary.

COMPARATIVE YEARLY SUMMARIES

	1953	1954	1955	1956	1957	1958	1959	1960
Year to Date	94.2	91.2	95.3	98.3	91.1	86.3	91.8	94.1
Year Average	92.3	91.6	96.2	97.9	90.4	87.0	94.0	—

All of the above data is based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available.

PAPERBOARD OPERATING RATIOS†—National Paperboard Assn. Figures

COMPARATIVE WEEKLY SUMMARIES

	Aug. 20	Aug. 27	Sept. 3	Sept. 10	Sept. 17
1960	92	92	94	70	93
	Aug. 22	Aug. 29	Sept. 5	Sept. 12	Sept. 19
1959	95	96	97	76	98

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1960	96	97	98	97	97	96	81†	91†	—	—	—	—	—
1959	89	94	95	94	96	96	83	97	92	96	94	80	92

† *Per cents of operation based on "inch-hours" reported on a 6-day basis to the National Paperboard Association.*

SUMMARY OF PAPERBOARD STATISTICS—National Paperboard Assn. Figures

ITEM	THIS WEEK ENDING Sept. 17, 1960	LAST WEEK ENDING Sept.10, 1960	CUMULATIVE TO DATE Jan. 1, 1960 to Sept. 17, 1960
% Activity	93%	70%	91%
Total	320,971	237,708	11,380,669
Containerboard—Domestic Use.	172,028	117,880	5,857,074
Liner	115,954	78,663	3,918,235
Corrugating Material	51,720	35,850	1,750,932
Chip & Filler Board	4,354	3,367	187,907
Boxboard—Domestic Use	96,035	74,324	3,534,490
Folding	57,224	45,221	2,111,051
Set-Up	12,143	9,824	405,971
Special Food Board	26,668	19,279	1,017,468
Other Paperboard	52,908	45,504	1,989,105
Containerboard Type	23,527	24,080	954,132
Boxboard Type	29,381	21,424	1,034,973
Total Orders			
Received	312,608	246,054	
Unfilled End of Week	412,424	416,175	

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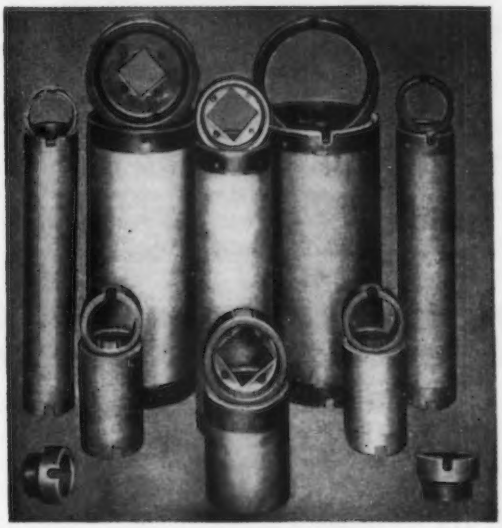

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Straight wound paper cores made in sizes from 2" to 10" inside diameter with any thickness wall required.

Long draw protected slot caps of heavy gauge steel in all standard sizes.

Heavy duty caps with reenforced square hole. This patented feature of reenforcement gives added strength and durability.

Samples of caps or cores will be gladly submitted

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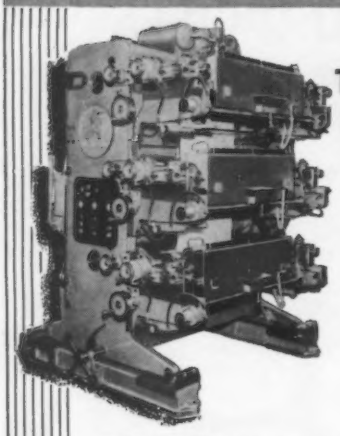
NEW POTDEVIN Multi-Color FLEXOGRAPHIC PRESSES



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Minimum operator attention . . . rigidity of design . . . precise printing even at 1,000 ft. per minute . . . competitively priced.

Designed as end printers for tandem operation with other web fed equipment. The Series 500 POTDEVIN Presses are available in 21", 26", 32", 36", 38" and 42" web widths.

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We are seeking a man who is thoroughly familiar with paper machine design, willing to work on the board if necessary, to complete layouts for detailers.

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If interested, send resume of education and work experience to:
Address Box 60-192 care Paper Trade Journal.

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MOLDED PULP CONVERTER

U. S. Pulp Manufacturer wishes to acquire converter of molded pulp products. Large sales volume is nice but perhaps what we are looking for is a young company just getting started, with technical know-how and without a permanent source of pulp. We are not affiliated with any molded pulp outlets and your inquiry will be held in absolute confidence. Your technical help and experience will be needed on a continuing basis.

Write Box 60-191 care Paper Trade Journal.

0-17

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SEALED PROPOSALS will be received until 10 a. m., E. D. S. T., October 10, 1960, in the room of the Joint Committee on Printing, in the Capitol, Washington, D. C., for furnishing the paper for the public printing and binding and blank paper ordered for the Government departments and establishments during the term of 3 months beginning November 1, 1960, deliveries to be f. o.b. Government Printing Office Warehouse, or warehouse siding, Washington, D. C.

The proposals will be opened in the presence of and the award of contracts made by the Joint Committee on Printing to the lowest and best bidders for the interest of the Government whose bids are in conformity with the requirements of the proposal. The committee reserves the right to reject any or all bids, or to accept any bid or any part and reject the other part if, in its opinion, such action would be in the interest of the Government.

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3— 76" face w/gears & bearings
3— 77" face w/gears & bearings
2— 84" face
2— 84" face w/accessories

36" Dia.:
1— 42" face
2— 44" face
2— 46" face
4— 70" face w/gears & bearings
11— 72" face w/gears & bearings
1— 74" face Lukenweld w/A-F Brng
1— 74" face w/gears & bearings
3— 75" face w/gears & bearings
5— 75" face
17— 76" face; complete section
9— 76" face w/gears & bearings
1— 77" face w/gears & bearings
1— 78" face w/gears & bearings
2— 80" face
5— 84" face
30— 84" face; complete section
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1—120" face
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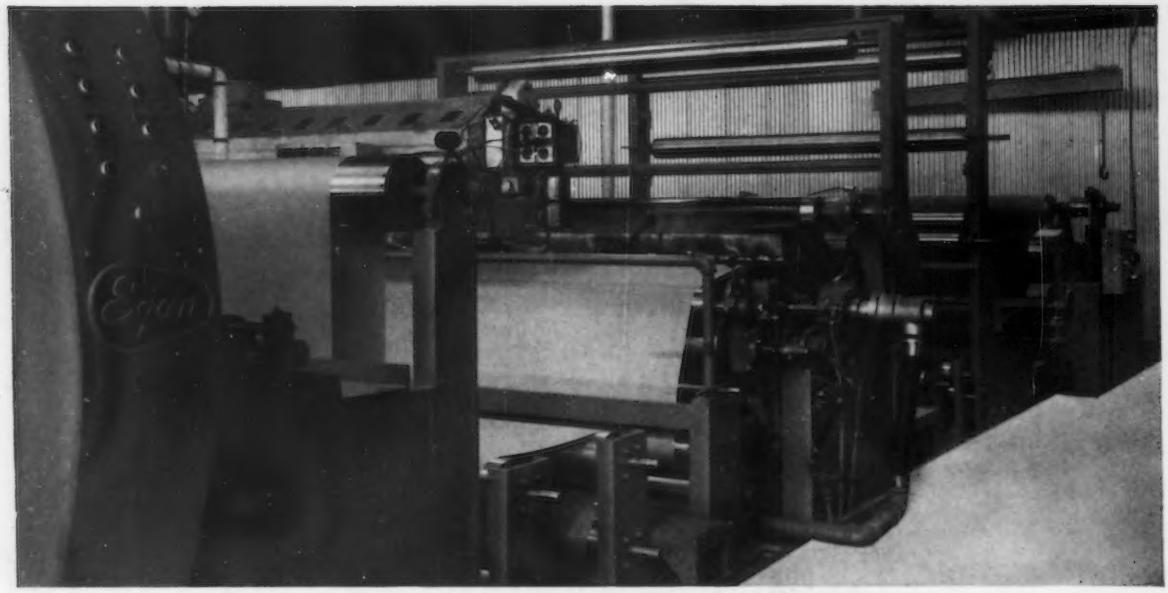

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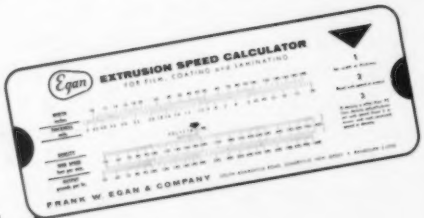

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